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CONTENTS PAGE

ENERGY CONSERVATION

Articles on Efficient Use of Fuels and Energy (TRUD, 12 Oct 79) 1

- State Efficiency Inspection
- Kostroma Workers Save Fuel
- Vil'nyus Bus System
- Gor'kiy Automobile Plant, by V. Ionov
- Alma-Ata--Contribution of Metallurgists, by M. Tairov
- Kemerovo--Coal Production, by G. Orlova

Accelerated Winter Preparation Called For (Editorial; KAZAKHSTANSKAYA PRAVDA, 25 Sep 79) 5

Strict Accounting For Each Gram of Fuel (V. Kolobov; SOVETSKAYA ROSSIYA, 1 Sep 79) 7

FISHERIES

Briefs

Fish Breeding Plants 10

FUELS AND RELATED EQUIPMENT

Fulfilling the Final Year of the Tenth Five-Year Plan Urged (I. I. Leshchinets; EKONOMIKA NEFTYANOY PROMYSHLENNOSTI, Sep 79) 11

Costs For Oil, Gas and Oil Production With Regard To Pricing (B. A. Bugrov, et al; EKONOMIKA NEFTYANOY PROMYSHLENNOSTI, Sep 79) 15

CONTENTS (Continued) Page

Optimization of Oil Production Plans and of Oil Field Exploitation Systems
(B. Z. Fattakhov; EKONOMIKA NEFTYANOY PROMYSHLENNOSTI, Sep 79) 19

Improving the Economic Effectiveness of Casing-Head Gas Refining Plants
(Ye. F. Popova, S. N. Yergayeva; EKONOMIKA NEFTYANOY PROMYSHLENNOSTI, Sep 79) 28

Efficient Use of Casing-Head Gas Resources
(E. M. Yasin, Ye. I. Kushnirova; EKONOMIKA NEFTYANOY PROMYSHLENNOSTI, Sep 79) 35

Overview of Oil and Gas Production in Turkmen SSR
(Ch. Karryev; IZVESTIYA, 5 Oct 79) 43

Mangyshlak Territorial-Industrial Complex
(M. Poltoranin; PRAVDA, 27, 28 Oct 79) 48

ENERGY CONSERVATION

ARTICLES ON EFFICIENT USE OF FUELS AND ENERGY

State Efficiency Inspection

Moscow TRUD in Russian 12 Oct 79 p 1

[Text] In response to the resolution of the CPSU Central Committee and Council of Ministers of the USSR "On Supplying the National Economy and Populace With Fuel, Electricity and Heat in the Fall and Winter Period of 1979-1980", collectives of enterprises and organizations have expanded the struggle for economy in fuel, electricity and heat. This is being greatly promoted by the All-Union Social Inspection on the efficiency with which raw materials, fuel and energy are being used. We now publish our regular selection of articles on this topic.

Kostroma Workers Save Fuel

Moscow TRUD in Russian 12 Oct 79 p 1

[Text] Since the beginning of the five-year plan, the collective of the Kostroma State Area Power Plant has saved 100,000 tons of fuel oil. To economize in both large and small matters is the slogan of the station workers. The saving of one gram of fuel oil for each kilowatt hour of electricity generated made it possible for the collective to meet its yearly quota for fuel savings 100 days ahead of schedule.

The struggle of the Kostroma workers for a careful attitude toward energy resources began 10 years ago, when the first 300,000 watt generator went into operation at the station. Specific fuel consumption became the determinate indicator in competition in all sections of production. In 10 years, it has been reduced from 382 grams to 319 grams.

Vil'nyus Bus System

Moscow TRUD in Russian 12 Oct 79 p 1

[Text] The drivers of the Vil'nyus bus system now use less gasoline per kilometer than last year. The optimum driving technique recommended by computer helps here. The computers list the optimum bus speed of each section of the route on the reminder list which is given to the drivers in addition to the travel sheet. The computers take the passenger load, road relief and road surface into consideration.

The bus park collective has saved more than one-half million liters of fuel in the current year. This is enough fuel to transport 3,300 passengers.

Gor'kiy Automobile Plant

Moscow TRUD in Russian 12 Oct 79 p 1

[Article by V. Ionov "Economy: The Main Indicator"]

[Text] The Gor'kiy Automobile Plant has significantly increased the power supply per production unit (new highly mechanized equipment has been placed in operation) while increasing electrical consumption hardly at all. It consumes almost the same amount now as at the beginning of the five-year plan: one billion kilowatt hours per year.

The slogan "Economize On the Large and Small Scales" has become a law for the automobile plant workers. The changeover of all plant circuits to a higher voltage has begun here. The work is extensive; it is necessary to prepare a system for transmission of 10 kilovolts, replacing cables in places and installing new power equipment. This program is already half finished.

At the same time, the service of the main power engineer of the enterprise has carried out another large-scale operation to replace incandescent lamps with mercury and fluorescent lights. The size of this operation is easy to understand if it is noticed that the same number of lights as in a city with a population of 500,000 burn at the plant during the evening, and even during the day in some places. After the change, the number of lights and the electrical consumption were cut in half, yet the illumination of the work areas was improved.

The search for means for reducing electrical consumption is being conducted along various paths. Much benefit is received from redesigning shops and modernizing equipment. For example, they replaced the arc furnace bath in metallurgical production and immediately saved more than one million kilowatt hours. The insulation of the heating unit was improved and energy consumption was reduced by another 1.5 million kilowatt hours. In all, this year the auto plant workers have already saved more than 20 million kilowatt hours of electricity.

There are persons responsible for saving electricity in each brigade, not to mention each section and shop. Previously, they were appointed by order from the administration. Now, the shop and section collectives have begun to calculate their own capabilities for reducing the consumption of electricity and have included them in socialist obligations.

This indicator has been converted into an important factor when distributing class places in competition and has the most direct influence on the amount of the material reward. The result is a collective responsibility for economy. It has become more effective. Incidently, the previous position of the persons responsible has been maintained, but the relationship of these people to the collective is now different. They have been changed from supervisors into helpers in fulfilling obligations.

The workers of the automobile plant have decided to save 30 million kilowatt hours of electricity in the current year. This is a large figure; this is enough to supply energy for 1.5 winter months to an area with a population of 300,000. Therefore, the collective is not reducing its efforts. Automatic systems are promoting economy. A special unit already controls the external lighting of the vast territory of the enterprise. Preparation is under way to develop a unified automated system for controlling energy consumption.

Alma-Ata -- Contribution of Metallurgists

Moscow TRUD in Russian 12 Oct 79 p 1

[Article by M. Tairov, Instructor of the Kazakh Republic Trade Union Council]

[Text] The social inspection for economy in material and energy resources at the Karaganda Metallurgical Combine is under way under the slogan "Think, Count and Save!".

More than 26,000 persons are participating in the drive for economy and thrift. The results of the inspection are released monthly in the shops, sections and brigades.

The workers of the enterprise have submitted 2,522 proposals providing a savings of 5,240,000 rubles in the first six months of this year alone. During this time, 50 million kilowatt hours of electricity and 42,000 tons of standard fuel have been saved.

The catcher V. Gorbunkov and the senior electrical foreman A. Debelyy performed calculations on separating the production line illumination of the shop into groups. Now, the powerful lights burn not at the same time throughout the entire shop, but rather in groups according to production necessity. More than 6 million kilowatt hours of electricity have been saved in seven months in the second sheet rolling shop. Here is one more example. As a result of an improvement in the cleaning of oil and by means of other measures introduced into the lime burning shop the output of the furnaces has been increased with more efficient use of heat. In comparison with the standards in effect, 5,760 cubic meters of compressed gas have been saved.

The republic commission on supervision of the social inspection for efficient utilization of raw materials, fuel and energy has gathered and popularized the experience of the Karaganda Metallurgical Combine on the saving of fuel and energy.

Kemerovo -- Coal Production

Moscow TRUD in Russian 12 Oct 79 p 1

[Article by G. Orlova, Chief of the Coal Quality Control and Standards Directorate of the "Kemerovougol'" Production Combine: "Millions of Tons of Coal are Being Lost"]

[Text] The majority of the 16 coal pits of the Kuzbass are in beds of complex structure containing two, five or more layers of rock which comprise up to one-tenth of the bed. For this reason, the ash content of the coal in certain beds ranges from 4% to 25-30%. Therefore, one-fourth of the coal produced exceeds the standard requirements for rock content. The quantity of non-standard coal increases when it is delivered without crushing and sorting.

This cannot help but cause difficulty when using this coal, for all enterprises in the nation are designed to operate on standard fuel. This is especially true for the electrical power plants in the European portion of the nation which are totally unsuitable for burning the lump coal delivered from the mines.

In order to meet the State Standards, all of the coal should be processed on the spot where it is mined. However, the rate at which machinery has been placed in operation to crush and enrich coal lags significantly behind the rate of increase in coal extraction. For this reason, approximately 65% of the fuel is unloaded in unsorted form directly from the dumps by excavators with shovel capacities of 4-8 cubic meters. The use of blasting operations for mining also fails to meet the required size standards, and furthermore this coal is additionally contaminated with rock and, as a result, losses increase.

The situation which has developed makes it necessary to solve the problem not only by improving the quality of the fuel which we ship, but also (and this is no less important) by reducing operating losses. The amount of coal dumped into spoilbanks (and irretrievably lost) at the mines increases from year to year. While in 1970 such losses totalled approximately three million tons, last year they were already 4.6 million tons. Losses are especially high in beds 1-5 m thick of gentle and steep dip.

The general line for improving the efficiency of open pit mining of coal and ensuring that standard fuel is produced should be the construction of complexes to process it at all mines. Sorting of coal on the spot would make it possible to significantly reduce the fuel shortage for communal living needs and increase the efficiency with which siftings are used at electrical power plants. Coal consumption could be reduced by more than 20% if the consumers burned sorted coal in place of the unsorted and uncrushed coal which is now delivered to them. Furthermore, expenditures for the construction of complexes to process coal at the mining site pay for themselves in two or three years.

However, despite the colossal benefits, the placement of coal processing equipment in operation is being delayed without justification. The construction of enriching installations and plants has been repeatedly provided for in the plans for combines and ministries. However, none of the deadlines has been met. We feel that the Ministry of the Coal Industry of the USSR and the State Planning Commission of the USSR must provide for obligatory construction of such complexes at large coal mines in the plans for the following five-year plan.

7872
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ENERGY CONSERVATION

ACCELERATED WINTER PREPARATION CALLED FOR

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 25 Sep 79 p 1

[Editorial: "Prepare the Enterprises for Winter"]

[Text] The editorial points out that winter is near at hand and that preparations for it must be accelerated in order for industries to be properly prepared. It is pointed out that many Party and Soviet organs, heads of ministries and departments and production units are proceeding according to schedule. The food industry is preparing for winter carefully. The preliminary work is completed and the concluding operations are under way in practically all food enterprises. Progress is proceeding well in the ferrous metallurgy, machine construction and light industry enterprises and in the Chimkent, Dzhambuli, Aktyubinsk and Pavlodar railroad sections and in the majority of auto transport enterprises.

However, it is pointed out that certain industries and enterprises are not preparing carefully enough. The Central Committee of the Communist Party of Kazakhstan and the Council of Ministers of the Republic ordered the ministries, departments, executive committees and administrations of railroads and industrial combines and enterprises in August of this year to increase the extraction, production and transport of fuel and to stockpile reserves of it at electrical power plants, enterprises and organizations in order to avoid the problems of the past fall and winter and set specific deadlines for this work.

However, it is pointed out that these deadlines are not being met in certain cases. The editorial states: "Production of fuel is increasing at an insufficient rate in the 'Karagandaugol'' and 'Ekibastuzugol'' combines. The Tselina and Alma-Ata railroads are failing to supply even enough railroad cars to transport the coal already mined. Due to this, the schedules for stockpiling reserves of fuel at electrical power plants, industrial enterprises, construction enterprises and communal housing centers are not being met."

It is pointed out that the leaders of Party and trade union organizations and all collectives of fuel and energy and transport enterprises must analyze the situation and take the most urgent steps to eliminate all defects existing in winter preparations. All equipment must be put into order in order to conserve energy. The editorial points out the serious situation in the construction industry. It is stated that 10-15% of work time was lost last winter in the construction industry in the coldest regions of the northern, western, central and eastern areas of the republic. Furthermore, "preparation for winter is still behind schedule in organizations in these areas such as 'Ural'sksel'stroy', 'Aktyubtyazhstroy', 'Tselinogradpromstroy', 'Petropavlovsksel'stroy', 'Pavlodarzhilstroy' and others."

Other problems pointed out that repair work has not even begun yet at the third hydrometallurgical shop of the Ust'-Kamenogorsk Lead-Zinc Combine, that the switching systems on more than 500 km of railroad in industrial enterprises have not been repaired and that work is proceeding slowly to repair boilers and redesign flues at the Kapchagay heating plant.

In conclusion, the editorial states that the primary responsibility of Party and trade union committees, Komsomol members, communists and trade union activists is to show an example of exactingness so as to create the proper atmosphere for efficient work during the difficult period of winter, fulfill the plans and responsibilities of the current year and get a good start on the final year of the five-year plan.

7872
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STRICT ACCOUNTING FOR EACH GRAM OF FUEL

Moscow SOVETSKAYA ROSSIYA in Russian 1 Sep 79 p 2

[Article by Special Correspondent for SOVETSKAYA ROSSIYA V. Kolobov]

[Text] The following could be heard on the train: "There is the flare. It means that we are near Ryazan'."

However, this "soon" turned out to be another half hour, this is how far the flares from the oil refinery were visible, especially at night. My co-traveller, the refinery engineer, told me that a flare burns twenty to one hundred tons of gas per hour.

It is simple to assume that product losses at oil refineries are unavoidable and that they are provided for by the technology itself. These were the figures for the Ryazan' refinery in recent years: in 1975, 1.1% by volume of the refined product, and 1.78% last year. This is for a normal loss of 1.15%. Thus, several thousand tons of petroleum products above the norm were lost.

However, in the first half of this year these losses were reduced by more than 50% in comparison with last year. May we conclude that talk about the unavoidability of them is simply forced?

On the side of the refinery road we read the slogan: "Each worker must save material! Struggle against losses!". To be fair, it must be noted that much has been done at the enterprise to put this slogan into action. A number of systems promoting more efficient fuel consumption have been installed. The Party Committee has held seminars for the shop Party organization secretaries and specialists at which means for further reducing losses were examined. Party meetings were held in all services devoted to increasing the role of communists in the struggle for economy and thrift. The Party Committee included the people's monitors in this movement. Significant corrections were made in the conditions for competition. While previously irretrievable losses were not taken into consideration when reviewing the fulfillment of socialist obligations, they have now become one of the main points of competition. A new system for economic stimulation for the struggle against losses has been introduced. The rule that those at fault must be held accountable is now strictly observed.

There is a special laboratory at the refinery which is correctly called the environmental protection shop. Each day, its operators take samples from the test shafts set up at each installation, determine the loss of petroleum products and write a report on the spot. Until recently, being a monitoring unit, the laboratory stopped here. It did not know how far the reports went or what measures were taken in response to them. In general, few knew. Now this has stopped. The head of the laboratory reports the position with losses daily to the director's office.

The assistant head of the laboratory R. Kozhevnikova says:

"Previously, we did not even know the names of the installation operators. Now, they call the laboratory and interrupt us. Paths have been cleared to all test shafts and sampling devices have been installed."

The cold weather has begun. However, the communists of the refinery still have much to do in order to get through the winter smoothly. The struggle for economy and thrift will become more effective if all workers of the enterprise are involved in it. Regrettably, however, many still feel that losses cannot be avoided.

For example, the chief of shop No. 8 V. Makeyev calmly listed the number of flares which a given similar refinery in the nation has. Whether he wanted to or not, he emphasized the fatal unavoidability of burning 20-100 tons of gas per hour. However, if this is fatal, the conclusion must be that attention must be devoted to flares. A philosophy has developed which justifies losses. We had a pointed dialogue with the workers. When I asked why they permitted the tanks to be overfilled, one of them answered: "From one bucket to another; are these losses?". The shop foreman N. Ratkin joined the conversation: "There are losses in every job; for example, when you cut bread you leave crumbs...".

However, Nikolai Grigor'yevich, a member of the raw materials section Party bureau, who is responsible for the activity of the people's monitors, accused those guilty of losses in the multi-page refinery newspaper.

To be fair, the statement "From one bucket to another; are these losses?" is not said flippantly. In the eyes of the workers, a sea of gasoline, fuel oil and liquified gas is spilled due to the fault of the railroad workers who deliver faulty wagon cars to the loading docks. At the refinery, I was told that in six months of this year the Sten'kino-2 station had delivered 301 damaged tanks to the refinery. The contents of 19 of these could neither be repumped into good tanks nor drained back into the raw materials stockpile. Gasoline, diesel fuel and fuel oil leaked from them onto the railroad tracks. In winter, poorly closed valves become covered with ice after the tanks are steam cleaned. Along the route they thaw out and the tank is sometimes empty before this is detected.

Who would be willing to reimburse the state out of his own pocket for even a portion of the loss? Incidently, the position on material stimulation states that the chief of a ship is deprived of the award if losses are above standard. Yet what is the case in practice? I asked the secretary of the Party committee V. Mysev whether he knew persons on whom the director of the refinery had used such sanctions. Vladimir Ivanovich could not remember such a case. This means that the Party committee is not devoting sufficient attention to the struggle for savings in raw materials. Its consistency in practical actions is insufficient. For example, after discussing the question about the struggle against losses and adopting a decision which was good in principle, the Party committee did not show concern about carrying it out. They have not returned to this problem this year. It is absent from the Party committee work plans for the future. Meanwhile, certain technological measures directed toward combatting losses are being carried out extremely slowly. In 1976, for example, a graph was compiled on the drifting toward the surface of underground pipelines. However, it is not being observed in practice. Three above-ground oil tanks were built several years ago at the refinery, but they are still not in operation. It was found that the automatic fire extinguisher systems were not installed on them. Now, they say that there is a lack of cable. However, we feel that this type of excuse is not serious. They only indicate the lack of a sense of responsibility for the entrusted matter on the part of the leading workers.

Practice shows that losses of petroleum products may be minimized. For example, they are only 0.73% at the Novoyaroslavl Oil Refinery. This is a good example! Comparing themselves with it, the Party committee and the administration should approach the implementation of the outlined measures more strictly and increase the responsibility of the cadres for their fulfillment. The well-known resolution of the CPSU Central Committee and Council of Ministers of the USSR "On Improving Planning and Increasing the Influence of the Economic Mechanism on Improving the Efficiency of Production and the Quality of Work" speaks about the necessity for improving the interest of the collectives in the best possible utilization of material resources. The communists of the enterprise have no end of work to do in this direction.

7872
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BRIEFS

FISH BREEDING PLANTS--There are plans to construct an autumn chum fish breeding plant on the Barabash River with a capacity of 50 million young fish. Two more fish breeding plants of similar capacity on the Kiyevka and Serebryanka rivers are also planned. [Vladivostok Domestic Service in Russian 0215 GMT 28 Nov 79]

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FUELS AND RELATED EQUIPMENT

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FULFILLING THE FINAL YEAR OF THE TENTH FIVE-YEAR PLAN URGED

Moscow EKONOMIKA NEFTYANOY PROMYSHLENNOSTI in Russian No 9, Sep 79 pp 3-5

[Article by I. I. Leshchinets, Ministry of the Petroleum Industry: "Mobilize All Reserves to Fulfill the Plan of the Final Year of the 10th Five-Year Plan"]

[Text] Intensive work to accomplish the planned tasks for 1979 is under way at enterprises and in organizations of the sector. Exploitation of a number of new oil files was begun during the first six months in the sector and more than 2,500 new wells and a number of most important objects for production, collection, preparation and transport of oil and gas were put into operation.

The workers of the sector mobilized all efforts during the most complex weather conditions of the winter of 1978-1979 in order not to permit a shutdown of oil production. The severest conditions were established at the associations Komineft' [Association of the Petroleum Industry of the Komi ASSR], Permneft' [Association of the Petroleum Industry of the Permskaya Oblast] and Tatneft' [Association of the Petroleum Industry of the Tatar ASSR] and in some regions of Western Siberia. Significant difficulties were caused by spring flooding when entire industrial areas and oil production sections had to be switched off in some regions.

One cannot disregard the work of the drilling organizations. The volume of drilling operations, despite the indicated complexities, not only did not decrease, but was increased by 500,000 m compared to the corresponding period of 1978.

In this case the volumes of drilling operations were concentrated in the most effective directions.

The success of the drilling collectives of the associations Tatneft', Bashneft' [Association of the Bashkir Petroleum Industry], Kuybyshevneft' [Association of the Kuybyshev Petroleum Industry], Saratovneftegaz [Association of the Saratov Petroleum and Gas Industry], Belorusneft' [Association of the Belorussian Petroleum Industry] and Ukrneft' [Association of the Ukrainian Petroleum Industry], which are drilling in the fields in Western Siberia and also the drillers of the Niznevolzhskneft' Association [Association of the

Nizhnevolzhsk Petroleum Industry], working in the Komi ASSR should be especially noted. These collectives have honorably coped with the tasks on the volumes of work carried out by the watch-expeditionary method. The volume of drilling carried out by this method was increased 2.5-fold during six months compared to the first six months of 1978. The drillers at the oil fields of the Udmurtskaya ASSR are working well, providing the development of new oil-producing capacities and an increase of the volumes of oil production in the region.

The oil industry workers carried out important work under complex conditions--more than 6,000 geological-technical measures were implemented, including those on artificial effects, the beds and the bottom zones of wells, optimization of the operating conditions of inactive and idle wells, conversion of wells to more effective methods of operation and other measures to ensure fulfillment of the oil production tasks. A number of measures was implemented to increase the level of using casing-head gas, which reached 70 percent.

Specific reserves occur along with specific positive results in development of the sector. One must primarily note that not all the collectives are coping with the established tasks. A significant number of drilling brigades are still operating with low technical-economic indicators. A similar situation also exists among derrick-installation brigades and brigades for routine and capital repair of wells. There is a lag in construction of some of the most important production objects which determine the possible production volumes and cooperation and transport of oil and gas. Problems of material-technical support of production are not always being solved in an operative manner. There are reserves in organization of production and labor and in economical expenditure of material-technical resources.

Preparation toward implementation of the 1980 program, which completes the 10th Five Year Plan, is now under way at all the enterprises and organizations of the sector. Extensive work remains in working out the Tekhpromfinplans [Technical-Industrial Financial Plans] of Associations and tasks by enterprises, shops, brigades and other production subdivisions. Working out the main measures to ensure development of the sector in 1980 is being completed.

However, the attention of managers and all the collectives should primarily be concentrated on completing the work on careful preparation of the enterprises for operation during the fall-winter season of 1979-1980. Operating experience shows that successful work during the fall-winter season predetermines successful fulfillment of the annual tasks.

The main tasks of the plan for the first quarter of 1980 have been brought to the associations and enterprises. Daily fulfillment of the tasks from the first day of the year should become the rule of each enterprise and of each subdivision. Only in this case can one count on the fact that the planned tasks for 1980 will be realized.

The economic services of the associations, enterprises and organizations of the sector are faced with important problems. Each shop and each subdivision must have clear plans and clear tasks. The economic services at all stages of working out implementation of the plans must organize the work to find reserves, to take them into account in the plans, counterplans, socialist pledges and in working out and implementation of measures to fulfill them and to analyze the course of fulfillment of the plan. The role and responsibility of the workers of planning-economic subdivisions for adherence to state planning discipline should be increased. The problem is to provide rhythmic fulfillment of the planned tasks by all subdivisions and by all indicators and not permit unjustified corrections of the plans of associations, enterprises and organizations throughout the year. One should be guided by the proposition that correction of the plan may occur in exceptional cases and only for reasons not dependent on the production and economic activity of associations, enterprises and organizations. In this regard the plans worked out and confirmed by the enterprises should be scientifically justified, based on planning indicators, confirmed norms, detailed calculations of all indicators and should be reinforced by a system of organizational and technical measures to implement them.

Problems related to the indicators for increasing production efficiency and product quality should be worked out especially carefully. The efforts of the economic services should be directed toward solving the most important problems of the current five-year plan and primarily toward an increase of the growth rates of labor productivity, improvement in the use of production capacities and economy of materials, fuel and electric energy and strengthening of cost accounting.

Specific labor expenditures for maintaining a single well have a wide range for different oil-producing regions and enterprises, even after exclusion of the effective factors typical only for individual regions. Comparative analysis of the labor indicators, study of the leading experience in organization of production and labor and combining of professions, increasing the service zones of production sections, disposition and utilization of working cadres, the structure of a time balance and other forms of finding reserves for increasing labor productivity should be taken on wide scales to arm the economic services of the apparatus of associations.

There are specific reserves at the enterprises of the sector in improving the use of production capacities. Attention should be turned together with the technological services toward the stock of wells being developed and awaiting development, in conservation and in the stock of test and observation wells. The stock of low-yield oil and injection wells should be subjected to special analysis.

One of the problems is the participation of the economic services in working out progressive norms of consumption of materials and fuel-energy resources and also measures to introduce them.

Careful preparation and direct participation of the economic services in organization and conducting of inspections of economy and thriftiness usually increase the effectiveness of these inspections significantly.

Work has been completed in the sector mainly to strengthen the primary production sections occupied with oil production. At the same time, the problem of utilization of the economic levers of management in these sections has still not been worked out completely.

The correctness of development and adoption of a system of indicators as a function of specific operating conditions of shops involved in oil production (industries) and systems for stimulating the work of their collectives largely predetermines the operating efficiency of these subdivisions.

The economic subdivisions should continue work on further improvement of management, based on the need to provide the strictest regime of economy in consumption for management, being guided by existing legislation concerning the staffs and wages of workers of the management apparatus and the procedure for disbursement of funds to maintain this apparatus.

Serious problems must be solved in the sector of economic studies and of economic science. Planning method and methods for increasing the scientific justification of plans, development and introduction of ASPR [Automated Control System for Planning Calculations (under Gosplan)], a correct approach to solution of problems of efficiency of systems for exploitation of fields, justification of the most effective solutions in the area of exploration of fields and the priority of their development and introduction into exploitation primarily require further improvement.

It is very important to recruit a wider range of production leaders to the economic work at enterprises. Public offices of economic analysis, permanently operating production meetings, conducted inspections of production reserves and various forms of economic teaching should be used here. The use of various forms and methods of economic work at enterprises and organizations should be directed toward unconditional solution of the tasks for development of the sector in 1980.

The role of counterplans and socialist pledges as an important reserve to fulfill and overfulfill the 1980 plan must be increased, the active participation of labor collectives in development of the plans must be provided, the initiative of workers and collectives who adopt increased socialist pledges must be universally supported and new forms of socialist competition directed toward searching for and recruitment of internal reserves into production and toward overfulfillment of the 1980 tasks and of the five-year plan as a whole should be introduced more widely.

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FUELS AND RELATED EQUIPMENT

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COSTS FOR OIL, GAS AND OIL PRODUCTION WITH REGARD TO PRICING

Moscow EKONOMIKA NEFTYANOY PROMYSHLENNOSTI in Russian No 9, Sep 79 pp 13-15

[Article by B. A. Bugrov, T. N. Baybakova and Ye. P. Bochkov, VNIIKTEP]

[Text] Greater requirements are being placed on improving the method for determining prices for oil, gas and coal, the specific weight of which in the primary fuel-energy resources (TER) now comprises approximately 95 percent, at the modern stage of development of the country's economy. The predominant significance of organic fuel in the structure of primary TER production will be maintained for the foreseeable future. Therefore, exceptionally important attention should be devoted to improving the method of determining prices for oil, gas and coal.

Correct pricing for oil, gas and coal is possible only provided that there is proper consideration and forecasting of expenditures for their production, refining, transport and use. The specific weight of the individual constituents in the combined costs fluctuates over a rather broad range as a function of the specific conditions determined by mining-geological, transport and other factors. One should bear in mind in this case that the sphere of use of various types of organic fuel is far from identical.

The structure of the combined costs for production, transport and use of various types of fuels now appears as follows on the average throughout the country (table). The use of all types of fuel for observance of the principle of compatibility was provided as boiler-furnace fuel (at new large TETs in the first variant and for medium and small users in the second variant) when compiling the table.

As can be seen from the table, approximately half of the combined production costs of heating oil and 60-70 percent of coal goes to expenditures for production and approximately 35 percent goes to natural gas production (due to the high costs for transport of gas, which is 3-5 times less economical than transport of oil through pipelines).

Specific Weight of Individual Components in Formation of Combined Production Costs, Percent

(1) Показатели	(2) Топочный мазут		Природный газ (3)		(4) Уголь	
	I	II	I	II	I	II
(5) Разведка и добыча*	48,3	47,3	35,6	35,1	68,8	58,5
Транспорт (6)	9,3	9,1	35,9	35,4	9,0	7.7
Использование (7)	42,4	43,6	28,5	29,5	22.2	33.8
	100,0	100,0	100,0	100,0	100,0	100,0

*Including Expenditures for Preparation of Oil, Natural Gas and Coal Enrichment

Key:

1. Indices
2. Heating oil
3. Natural gas
4. Coal
5. Exploration and production
6. Transport
7. Utilization

Proper determination of the individual components of combined production costs, as one of two terms of the given expenditures, is important to solve a number of economic problems related to correct regionalization of the fuel-producing sectors, more efficient use of capital investments, optimization of the fuel-energy balance of the country, correct pricing for fuel-energy resources and so on.

The most complex among the enumerated tasks is the problem of pricing. Moreover, solution of most other economic problems depends on correct solution of this problem.

The presently existing wholesale prices of enterprises for oil, natural gas, casing-head gas and coal suffer from a number of significant disadvantages, among which the main one is their lower level compared to socially necessary labor expenditures.

When solving pricing problems for fuel-energy resources, a differentiated approach to establishing prices for primary (oil, gas and coal) and converted fuel-energy resources is necessary. All types of TER must also be divided into interchangeable (natural gas, energy coal, heating oil and so on) and non-interchangeable (gasoline, diesel fuel, lubricating oils, petroleum bitumens, raw material for petrochemistry, coking coal, products for refining of fuel shales, coal, bituminous oil and so on). Various points of view have been expressed in the economic literature on the problem of pricing for primary fuel-energy resources.

The average sector costs exclude the idea itself of a differential annuity. In practice this approach to pricing in the fuel-producing sectors of industry leads to the fact that approximately half of all enterprises operate at at loss, which not only leads to destruction of cost-accounting principles of the producer enterprise operation, but will also not contribute to efficient use and saving of fuel-energy resources among users, especially of such unique energy and raw material sources as oil.

In this regard, one must proceed, we feel, from principles of equalization for the worst mining-geological and natural-climatic conditions when determining prices for oil, gas and coal.

Orientation in pricing for the products of the mining sectors of industry, based on the worst conditions, makes it necessary to determine their qualitative and quantitative estimate.

With this approach to estimating production costs for oil, natural gas and coal, the question naturally arises as what is understood as the worst conditions. We feel that the worst conditions should be understood at the boundary between a group of fields (basins) which provide the main covering of the country's needs for a given type of TER (by approximately 90 percent) and the group of fields which do not cover this need.

Thus, production expenses for oil, natural gas and coal from fields outside this boundary do not affect the fuel-energy resources at the pricing level. At the same time, these fields have costs which significantly exceed those for the "boundary" fields.

This principle of pricing will not only stimulate an increase of production efficiency at the closing enterprises, but will also facilitate pricing in practice.

Moreover, the efficiency of producing local types of fuel (peat and shales) can be determined rather precisely in this case, having determined the combined reduced expenditures for their production, transport and use.

The approach advanced above toward establishing the level of prices for oil, gas and coal should be further expanded by dividing all types of fuel-energy resources into two groups of TER: interchangeable types of fuel-energy resources or so-called boiler-furnace fuel, and noninterchangeable types of fuel-energy resources.

The bonuses for those types of fuel, refining and use of which make it possible for the user to achieve an additional saving (mazut and natural gas with low sulphur content and low-ash and low-sulphur energy coal), must also be provided in prices for boiler-furnace fuel.

The additional profits (including additions to the price for production of fuel which is more qualitative in view of its own physicochemical properties), which arise among enterprises with especially favorable mining-geological conditions, should be withdrawn in view of the fixed (annuity) payments to the state budget. This makes it possible to eliminate the effect of more favorable mining-geological conditions on the operating indices of enterprises, which places them in approximately an identical position. Besides costs for transport, normal profitability to the service and transport organizations must be provided. In this regard some completion of existing methods and with respect to gas pipelines development of new methods of determining transport expenses are necessary since creation of a unified gas supply system for the country makes it extremely difficult to distribute these expenditures among individual gas pipeline sections.

We feel that the price system for noninterchangeable types of energy resources should be structured on a basis which includes construction of special balances with use of economic-mathematical models and optimization calculations.

These balances are now structured according to a very limited range of energy resources with rather strong aggregation (for example, the balance of light petroleum products).

Moreover, the degree of aggregation should be more detailed. Thus, construction of special optimum balances by individual groups: by individual grades of automobiles gasolines (for example, AI-93, A-76 and A-72) and of diesel fuel (summer or winter with sulphur content from 0.2 to 0.5 percent), rather than for all light petroleum products as a whole, is necessary for proper pricing for light petroleum products. This task may and should be solved within the framework of optimizing the development and disposition of the petroleum and petroleum refining industry with subsequent construction of detailed optimum special balances which take into account the need for one or another type of product by economic regions and optimization of its production and transport. The balance of coking coals can be compiled with more consolidation.

The proposed system of pricing for TER does not exclude the individual characteristics of their formation for the crude oil, posed by NPZ [Oil refining plant] and also retail prices. However, it permits a significant improvement, we feel, of the existing pricing system in the sphere of TER production and use, including the struggle to economize on them, and will eliminate the need for development and use of other methods of solving a number of problems (for example, closing expenditures for fuel and energy).

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FUELS AND RELATED EQUIPMENT

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OPTIMIZATION OF OIL PRODUCTION PLANS AND OF OIL FIELD EXPLOITATION SYSTEMS

Moscow EKONOMIKA NEFTYANOY PROMYSHLENNOSTI in Russian No. 9, Sep 79 pp 15-20

[Article by B. Z. Fattakhov, TatNIPIneft']

[Text] The oil fields of the USSR are now being put into operation usually on the basis of process flow diagrams and exploration plans, while the oil production plans are compiled mainly on the basis of planning documents for the fields with regard to the actual state of their exploitation. This is an important achievement of Soviet scientists on exploitation of oil fields, oil-field geology, underground hydrodynamics and the economic science of the sector.

But at the same time, the established procedure of design and planning has significant deficiencies. The main problems of optimizing the oil production plans are being solved in exploitation diagrams and plans (i.e., at the level of the fields) in which not only the exploitation system but also the levels and dynamics of oil production are selected and, moreover, the distribution of oil production, exploitation drilling of wells and capital investments by fields is predetermined. The oil production plans are usually optimized at the level of the production association and the sector level.

Moreover, theoretical investigations and analysis of the accumulated experience show that it is not possible to justify the optimum rates of oil sampling and the dynamics of oil production at the level of the fields and thus, it is impossible to optimize the distribution of oil production and well drilling by fields. Therefore, the oil production plans compiled on the basis of planning documents and also the planned solutions adopted at the level of the fields are not always optimum at the level of production associations and the sector. Moreover, the established planning procedure at which a single confirmed planning variant is taken as the basis for each field does not correspond to the principles of optimum planning which presumes compulsory consideration of several versions of the plan for each field.

Hence, the problem arises of optimizing the oil production plans and systems for exploitation of oil fields at the level of the production associations and the sector.

This problem may be considered as an important and complex system and may be separated into its components--into the following complex of subproblems:

optimization of the distribution of oil production, exploitation drilling of wells and capital investments by fields (areas);

optimizations of the sampling rates and dynamics of oil production by fields;

optimization of systems for exploitation of oil fields: the number of wells, the systems and configuration of their disposition, the volumes and complexes of methods of acting on the bed, intensification of production and increasing the yield of beds;

optimization of the priority and rates of drilling of oil fields and implementation of methods of intensifying oil production at them and increasing the yield of beds by stages of exploitation and by years;

provision of the maximum yield coefficient of beds with existing economic restrictions;

coordination of oil production plans with those for preparation of new reserves and planning documents;

consideration of the effect of planning decisions for some objects on the decisions adopted for other objects.

Analysis shows that all these problems are related to each other in such a way that if one of them is not solved in an optimum manner, all the remaining ones and also the problem as a whole are not solved in an optimum manner. Thus, oil production plans and systems for exploitation of oil fields cannot be optimum until the sampling rates and dynamics of oil production, distribution of oil production, exploitation drilling of wells and capital investments by fields are optimized. In the same way, the distribution of oil production by fields cannot be optimum until the sampling rates and dynamics of oil production by fields and their corresponding exploitation systems are optimized.

Moreover, not one of the enumerated subproblems can be solved separately from the others. Hence, it follows that the enumerated subproblems and the problem as a whole can be solved only with complex consideration of them at the level of the production associations and sector on the basis of using methods of systems analysis and economic-mathematical modelling.

Hence, it also follows that the problem of optimizing the systems for exploitation of oil fields is not and cannot be an isolated problem and that optimization of the exploitation systems is an inseparable part of a more general problem of optimizing the oil production plans.

The levels and dynamics of oil production and the coefficient of bed yield are considered in this case as the goals of the plan, while the exploitation systems of oil fields, the rates of drilling them and the entire complex of methods of acting on the bed is regarded as the means of achieving these goals.

The problem of optimizing oil production plans at the level of production associations is related in the most intimate manner to the problem of optimizing oil production plans at the sector level, on the one hand, and at the level of the fields, on the other hand. Solution of the problem therefore opens up new prospects for improving planning not only at the association level, but also at the sector and field level, and opens up new opportunities for increasing production efficiency.

Optimization of oil production plans at the level of production associations assumes the optimization of all the production processes in exploitation of the fields--the levels and dynamics of oil production, the entire complex of methods of acting on the bed, intensification of oil production and increasing the yield of beds--for all exploitation objects simultaneously with regard to the geological-economic characteristics, actual status of exploitation and production conditions established by the time the plan is compiled, based on the unified requirements placed on them on the part of associations, the ministry and the national economy for the same future period.

Optimization of future oil production plans and exploitation systems of oil fields at the level of production associations in the sector, however, does not exclude, but assumes the compilation of schemes and plans for exploitation of oil fields and coordination of planning and design documents with each other.

Thus, optimization of future and current oil production plans and exploitation systems of oil fields at the level of the production associations and the sector, along with compilation of exploitation diagrams and plans, is compulsory.

But to do this, a corresponding complex of methods of solving the problem should first be developed. The most important link in this case is development of a scientifically justified system of criteria and models of optimization, methods of calculations and economic evaluation of planning variants with regard to the characteristics of the sector and the dynamic problems solved here. The method of economic justification of the schemes and plans for exploitation of oil fields should should be improved at the same time with this, bearing in mind that the planning and design documents may supplement each other and may bring them closer to optimum solutions only if criteria and methods of optimization coordinated with each other are used in them.

As a system, the petroleum industry is a part of a higher level system--the fuel-energy complex of the country--and is the aggregate of many subsystems of several hierarchical production levels: the ministry-production association-field.

Each hierarchical level has its own specific goals and means of achieving them which are subordinate to the overall goal of development of the sector--to meeting the current and future needs of the country for oil, casing-head gas and gas condensate with minimum expenditures by the national economy and more efficient use of natural petroleum resources.

The following system of criteria and models of optimization (the level of associations and fields is mainly discussed below) can be formulated on the basis of analyzing the goals of achieving them and the most significant relationships and functions between them at each planning level.

The central and main cost-accounting link in the system of the petroleum industry is the oil- and gas-producing production association, which has a complete production cycle, including prospecting, exploration, drilling, development and exploitation of oil fields, production, collection, transport, preparation and delivery of the oil to the main structures of major oil pipe lines and of casing-head gas to the gas refining plants.

The oil production plans for production associations (i.e., the levels and dynamics of oil production and the volumes of exploitation drilling of wells by associations and the levels and dynamics of oil production by fields and their exploitation systems) are regarded as optimum if the following are provided:

an optimum fraction of participation of the association in all-union production, i.e., minimum expenditures in fulfilling the intended version of the plan through the sector;

fulfillment of the versions of the plan intended by the association with minimum capital and current expenditures for prospecting and exploitation of oil fields;

the most complete utilization of proven reserves in the association and the maximum yield coefficient of the beds with existing geological-technological, technical and economic restructions;

maximum reduction of losses of oil, casing-head gas and light hydrocarbon fractions inthe fields during production, collection, transport and preparation;

the reliability of fulfilling the plans for production of the final product--oil, casing-head gas and gas condensate with the resources allocated to the association.

The first requirement of the criterion--optimum fraction of participation of the association in social production--is provided on the basis of optimizing the oil production plan at the sector level.

The second requirement--fulfillment of the versions of the plan intended by the association with minimum expenditures--is provided by optimization of the distribution of oil production, exploitation drilling of wells and capital investments by fields, rates of sampling and the dynamics of oil production by them, the exploitation systems of the fields and the rates of their drilling at the level of the production associations.

The third and fourth requirements--more complete use of proven reserves and an increase of the yield coefficient of beds with existing economic restrictions, reduction of losses of oil, casing-head gas and light hydrocarbon fractions--are closely related to each other and supplement each other. They are directed toward increasing the resources of hydrocarbon raw material, although the means of achieving them are different.

Continuous expansion of the boundary of economic restrictions--the increase in the level of maximum expenditures for production of one ton of oil--occurs as the need for oil and petroleum products increases and as the provision with oil reserves deteriorates. And this in turn expands the boundary of use of the more expensive methods of increasing the yield of beds and putting less economical oil pools into operation.

The fifth requirement--the reliability of fulfilling the plan--is regarded as one of the most important conditions of the optimum nature of plans, since any underfulfillment of the plan, whether at the level of the sector, association or field--is related to additional expenditures at other objects in other sectors of the fuel industry.

Based on the foregoing, the economic-mathematical model for optimization of oil production plans and exploitation systems of oil fields at the level of the production associations is written in the following manner:

$$F_j(q_{ijt}; N_{ijt}) = \sum_{i=1}^{m} \sum_{t=1}^{T} q_{ijt} C_{ijt} \longrightarrow \min,$$

provided that $\sum_{ijt} q_{ijt} = Q_{lt}$ for all values of t; $q_{ijt} \geqslant 0$; $K_{no} \rightarrow \max$;

$$K_{\text{п}} \longrightarrow \min; \; C_{c\,jlt} \leqslant C_{\text{пред}}$$

Here i is the index of the fields and is (i = 1, 2, ..., m); t is the index of the year of the planning period (t = 1, 2, ..., T); j is the index of the versions of development of oil production by fields and areas (j = 1, 2, ..., n); l is the index of the versions of development of oil production by association (region); q is oil production by fields and areas; N is the number of wells by fields and areas ; C is expenditures for exploration and exploitation of oil fields per ton of oil; K_{no} is the yield coefficient of the beds; K_p is the coefficient of losses of oil, casing-head gas, petroleum and gas condensate during production, collection , preparation and transport to the plants; Q is oil production by association (region); C_s is the cost of producing one ton of oil; and C_{pred} is the maximum expenditures for oil production.

The distribution of oil production, eploitation drilling of wells and capital investments by fields (areas), the rates of sampling and the dynamics of oil production by them and their exploitation systems are optimized as a result of solving this problem.

Already existing concepts exist on the criterion of the optimum nature of exploitation systems at the level of fields. For example, an exploitation system which provides given oil production with minimum expenditures and the most complete use of oil reserves is regarded as optimum. The economic-mathematical model of the problem can be written in this case in the following manner:

$$F_{(N_{ijt})} = q_{it} C_{ijt} \longrightarrow \min,$$

where q is the given value and C may be different as a function of the variant of exploitation and the number of wells N in the field.

However, the problem can be posed in this manner only if the levels and dynamics of oil producton at the field are already known. This is not so in practice. Even if the rates of sampling and the dynamics of oil production by fields have already been determined on the basis of optimization at the association level, when compiling the exploitation diagrams and plans, variants with different level of production are again considered on the basis of more detailed consideration of the geological characteristics of the pool. Therefore, the problem may be postulated differently: which production plan (which sampling rates and production dynamics) at the field and what means of fulfilling the plan (exploitation system) should be considered as optimum?

With this postulation of the problem, the criterion of optimality is formulated differently: Those levels and dynamics of oil production in the field and the system of exploiting it in which the following are provided are regarded as optimum:

the optimum fraction of participation of the field in fulfilling the oil production plan by association (region), i.e., the minimum expenditures in fulfilling the intended versions of the plan by region;

fulfillment of versions of the plan by field (rates of sampling and production dynamics) with minimum capital and current expenditures;

the maximum yield coefficient of the beds with existing geological-technological, technical and economic organizations;

maximum reduction of the losses of oil, casing-head gas and light hydrocarbon fractions in the fields during collection, transport and preparation of oil and gas;

the reliability of fulfilling the production plan with the planned volume of enterprises.

The first requirement--the optimum fraction of participation of the field in fulfilling the oil production plans by association (region) and by sector--is provided primarily on the basis of optimizing future oil production plans at the level of production associations. It is provided in the exploitation diagrams and plans by equalization of the production volume by variants due to the assumed introduction of fields relatively worse in the sector into exploitation and comparative analysis of the effectiveness of capital investments directed toward intensification of oil production at a given field and toward introduction of these objects into operation.

The second requirement--fulfillment of the intended versions of the plan (rates of sampling and dynamics of production) at the field with minimum expenditures--is provided primarily on the basis of taking into account specific geological-economic indices of the pool with justification of the optimum volume and complex of methods of acting on the bed.

Based on the foregoing, the economic-mathematical model of optimization of oil production plans by fields and their exploitation systems is written in the following manner:

$$F_j(q_{ijt}; N_{ijt}) = \sum_{i=1}^{m} \sum_{t=1}^{T} q_{ijt} C_{ijt} \longrightarrow \min$$

provided $\Sigma q_{ijt} = Q_{it}$ for all values of t; $q_{ijt} \geqslant 0$;

$$K_{\text{но}} \longrightarrow \max; \; K_{\text{п}} \longrightarrow \min; \; C_{\text{с}\, ijt} \leqslant C_{\text{пр.д.}}$$

The given criteria and models of optimization have been strictly coordinated with each other and express the close relationship of the problems solved at different planning levels--from wells to the sector. The most significant characteristics, relationships and functions which occur in the sector are reflected in them.

Investigations show that the greatest economic effect due to optimization of plans is provided at the first stage of development of oil production by fields and associations. The dimensions of the effect then gradually decreases by the stages of development of oil production. But, despite this, optimization of plans may yield a significant effect at the last stage of development, without requiring additional expenditures.

After the oil production plan and exploitation system of oil fields have been optimized at the level of production associations and fields, they are optimized at the sector level, for which 3-4 organizational-technically possible versions of development of oil production for each association, optimized at the level of associations and fields, is accomplished. Moreover, one (the average) version should correspond to the control figures of the ministry. The optimum fraction of the participation of each association in All-Union production, the optimum levels and dynamics of oil production for them and the optimum means of achieving these levels: the volumes of exploitation and test drilling of wells, introduction of methods of oil production intensification and for increasing the yield of beds, capital investments and so on, are determined as a result of solving the problem.

The following operating procedure is feasible to provide the optimum nature of oil production plans and exploitation systems of oil fields at all three levels.

The control figures for development of oil production by sector and associations are determined.

Future oil production plans are optimized initially at the level of production associations with regard to the requirements placed on them above (including the control figures of the ministry) with regard to regional and sector factors. This is essentially the basis of an optimum sector plan.

Further optimization of oil production plans by fields and exploitation systems based on more complete and detailed consideration of the geological-economic characteristics of each field is accomplished in the exploitation diagrams and plans (i.e., at the level of fields).

After this, the future plans are optimized at the sector level on the basis of versions of the plan optimized at the level of production associations and fields.

Further optimization with regard to the course of fulfilling the plan and refining the initial geological-industrial information by the moment the current plan is compiled is accomplished in current plans in which the indicators of the future plan optimized at all three levels are taken as the basis.

A gradual approach of planning and design solutions to the optimum one is provided as a result of this combination of investigations in planned and planning documents, in future and current plans and in subsequent conversions with optimization from the level of Gosplan and the ministry to the level of associations and fields and then vice verse--from the level of fields to the level of associations in the sector.

Conclusions

1. Optimization of future and current oil production plans and means of fulfilling them at the level of production associations and the sector, along with optimization accomplished at present at the level of fields, can be feasibly put into planning practice in the petroleum industry. This is one of the most effective directions and most important tasks of sector economic science.

2. The methodical positions outlined above--postulation of the problem, criteria, models and order of optimization--can be used in optimizing the oil

production plans and means of fulfilling them at the level of production associations, fields and the sector. The use of them in practice will make it possible to increase the scientific level of planning and production efficiency.

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FUELS AND RELATED EQUIPMENT

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IMPROVING THE ECONOMIC EFFECTIVENESS OF CASING-HEAD GAS REFINING PLANTS

Moscow EKONOMIKA NEFTYANOY PROMYSHLENNOSTI in Russian No. 9, Sep 79, pp 29-32

[Article by Ye. F. Popova and S. N. Yergayeva, VNIPIgazpererabotka]

[Text] The need for a universal increase of production efficiency and improvement of product quality is indicated in the decisions of the 25th Congress of the Communist Party of the Soviet Union.

This problem becomes especially acute in the gas refining subsector, due to unsatisfactory support of GPZ [gas refining plants] with raw material, the differences between the capabilities of refining casing-head gas and marketing of the finished product, and also the imperfections of the wholesale pricing system of enterprises for gas refining products.

The highest level of use of capacities was achieved at the Kazakh, Nizhnevartovsk and Neftekumsk plants; the planned capacities were utilized somewhat lower at the Otradnoye, Minnibayevsk, Borislav and Voznesensk GPZ. The capacities at the Shkapovsk and Groznyy plants were utilized unsatisfactorily.

The resources of the fields of Orenburgskaya Oblast and also the wide-fraction light hydrocarbons (ShFLU), achieved during refining of natural gases at the Orenburg Gas Refining Complex, must primarily be utilized for more complete support of the GPZ with raw material (the Tuymazy, Shkapovsk, Neftegorsk and Otradnoye GPZ).

The volume of oil stabilization at the Voznesensk and Karabulak plants must be increased to load the Groznyy and Voznesensk GPZ and construction of the oil and gas collection objects must also be completed and assimilated for utilization of the gases from the final stages of separation.

Preparation of casing-head gas for mainline transport is the main task of the gas refining plants, but the index of sampling hydrocarbons C_{3+v} remains the main one as before in evaluating their production activity. In 1977 a number of plants improved this indicator. The achievements of the Dolino GPZ, which improved sampling of the C_{3+v} fraction from very poor in content of specific components of casing-head gases by 1.7 percent, must primarily be noted. A rather high percentage of sampling the C_{3+v} fraction for the sub-branch as a whole was achieved. The Minnibayevsk GPZ increased the extent of sampling the C_{3+v} fraction by 2.5 percent. The Neftegorsk, Tuymazy, Otradnoye, Neftekomsk and Gnedintsev plants improved this indicator somewhat.

The appropriate investigations were conducted and the extent of extraction of ethane, propane, i-butane, n-butane and the C_5+higher fraction was determined to refine the extent of extracting individual hydrocarbons at the gas refining plants.

It was established that propane extraction at the GPZ is higher, the greater the heavy components (even compared to C_5+higher hydrocarbons). This is explained by the absence of a unified method of calculating the extent of extraction of individual hydrocarbons. We proposed that the method be standardized for the gas refining plants, on the basis of which the total extraction of hydrocarbons should be determined on the basis of the integrated extraction coefficients K_{ij} by the formula

$$K_{ij}=\frac{\sum\limits_{i=1}^{n} x_j M_i}{p_j}\cdot 100,$$

where K_{ij} is the integrated extraction coefficient of the j-th component from the initial raw material, percent by weight; p is the number of types of liquid product produced by the gas refining plants; x_j is the content of the j-th component in the liquid product of the plant, percent by weight; M_i is the amount of the i-th type of liquid product produced, thousand tons; and p_j is the potential content of the j-th component in the initial raw material, thousand tons.

Along with the integral coefficients which determine the efficiency of gas from which gasoline has been removed, the differential coefficients K_{qi} must also be determined which characterize the efficiency of the gas-fractionation processes, the basis for calculation of which is the content of the specific component only in the fraction corresponding to it, since this will contribute to an increase of the economic efficiency of gas-refining plant operation.

An important indicator which characterizes the operation of enterprises is the reduction of non-returnable losses of raw material. Analysis of the losses is difficult due to the low level of measurements and the incorrectness of describing the product.

The GPZ are faced with the problem of developing measures to take into account and reduce the consumption of fuel for their own needs, which fluctuates from 1.1 percent of the volume of refined gas at the Nizhnevartovsk GPZ to 14 percent at the Perm' GPZ, and to reduce losses.

The activity of the gas refining plants is evaluated by the results of fulfulling the product sales plan by nomenclature, balance profit and profitability.

Table 1

(1) ГПЗ	(2) Сжиженные газы		(3) Отбензиненный газ	
	к 1976 г. (4)	к плану 1977 г. (5)	к 1976 г.	к плану 1977 г.
(6) Миннибаевский	100,7	102,3	94,9	103,0
(7) Туймазинский	97,2	101,0	83,9	126,0
Шкаповский (8)	106,3	101,2	99,9	106,1
(9) Отрадненский	—	—	90,3	103,4
Нефтегорский (10)	—	—	101,3	103,9
(11) Коробковский	100,1	85,5	78,6	81,1
Нефтекумский (12)	—	—	90,9	105,6
(13) Севкавнефтегазпереработка	296,1	81,8	168,5	110,8
Грозненский (14)	296,1	81,8	114,1	109
(15) Вознесенский	—	—	251,7	110,8
Пермский (16)	136,7	87,6	116,3	106,0
Нижневартовский (17)	—	—	131,9	109,3
(18) Гнединцевский	86,0	89,0	96,8	112,2
Долинский (19)	120,5	101,5	87,2	106,9
(20) Бориславский	102,3	130,3	105,4	132,9
Казахский (21)	99,6	81,7	122,5	120,1

Key:

1. Petroleum refining plant
2. Liquefied gases
3. Gases from which gasoline has been removed
4. By 1976
5. By the 1977 plan
6. Minnibayevsk
7. Tuymazy
8. Shkapovsk
9. Otradnoye
10. Neftegorsk
11. Korobkovo
12. Neftekomsk
13. Northern Caucasus Oil and Gas Refining Plant
14. Groznyy
15. Voznesensk
16. Perm
17. Nizhnevartovsk
18. Gnedintsev
19. Dolino
20. Borislav
21. Kazakh

The planned tasks for two types of products--liquefied gas and stable gas benzine--were not fulfilled through the subsector as a whole. Compared to 1976, the production of liquefied gas increased by 10.7 percent and that of stable gasoline increased by 8.6 percent.

Variation of the volume of produced product by the gas refining plants is presented in Table 1.

There are significant deviations from the average sector indicators by individual plants. The main increase of product throughout the sub-branch as a whole was achieved due to introduction of new production capacities into operation.

There are reserves at the GPZ of the subsector for increasing the volume of liquid product output by improving the use of production capacities, loading the plants with raw material of improved quality and increasing the extent of sampling. Expressed in cost, approximately 31.4 million rubles can be achieved by using these resources (Table 2).

Table 2

(1) ГПЗ	(2) Резервы производства (тыс. руб.) за счет				
	дополнительного использования мощностей (3)	(4) увеличения поставки сырья	(5) повышения качества сырья	(6) увеличения глубины отбора	(7) всего
(8) Миннибаевский	718,1	1200,0	—	—	1918,3
(9) Туймазинский	1073,1	119,6	144,7	—	1968,0
Шкаповский (10)	6326,5	835,1	265,6	—	7427,5
(11) Отрадненский	599,5	—	553,6	—	1153,3
(12) Нефтегорский	89,5	284,1	631,8	—	1005,4
(13) Коробковский	—	186,1	176,1	181,1	543,3
(14) Нефтекумский	138,6	—	52,8	—	191,4
Грозненский (15)	571,1	126,8	116,4	863,0	1171,3
(16) Вознесенский	3506,1	—	1170,0	306,8	4976,9
Пермский (17)	497,6	1663,9	1413,5	1528,6	5103,6
Нижневартовский (18)	—	—	—	1942,9	1942,9
(19) Гнединцевский	569,0	795,3	975,8	—	2340,1
Долинский (20)	692,6	—	—	1902,2	2594,8
(21) Бориславский	—	—	—	—	—
Казахский (22)	—	363,9	—	—	363,9
Всего по анализируемым ГПЗ (23)	15582,5	5599,3	3500,3	6718,5	31400,7

Key:

1. Gas refining plant
2. Production reserves (thousand rubles) due to
3. Additional use of capacities
4. An increase of raw material delivery
5. An increase of raw material quality
6. An increase of the extent of sampling
7. Total
8. Minnibayevsk
9. Tuymazy
10. Shkapovsk
11. Otradnoye
12. Neftegorsk
13. Korobkovo
14. Neftekumsk
15. Groznyy
16. Voznesensk
17. Perm
18. Nizhnevartovsk
19. Gnedintsev
20. Dolino
21. Borislav
22. Kazakh
23. Total for analyzed GPZ

The failure of the GPZ to fulfill the plan by the most important product nomenclature had a significant effect on the growth of product sales, profits and the level of profitability (Table 3). The profits for the analyzed GPZ comprised 44.7 million rubles during the previous year, it decreased to 30.9 million rubles in 1976 and to 40.9 million rubles in 1977. Profitability also decreased correspondingly--from 9.8 percent in 1975 to 5.6 percent in 1976 and 1977.

The main factor which caused a decrease of these indicators was an increase of the product cost. With an increase of the average annual cost of main and circulating funds by 21 percent, the volume of commercial products increased by only 8.2 percent compared to the previous year. The increase of cost caused a decrease of profits by 30.8 percent.

The tendency toward a reduction of profits is traced more clearly upon analysis of the specific indicators per 1,000 m^3 of refined gas. With an increase of the specific average annual cost of basic and circulating funds by 13.1 percent, the volume of commercial product per 1,000 m^3 of refined gas remains at almost the same leve, the specific expenditures increase by 7.5 percent and the specific profits decrease by 35.6 percent.

Implementing a complex of measures will contribute to improving the technical-economic indicators, to the use of production capacities and also to an increase of extraction of C_{3+v} hydrocarbons.

Introduction of the scheme of two-stage condensation of casing-head gas and conversion of operation of the methane column to the ASK [expansion unknown] mode at the Groznyy GPZ will make it possible to increase sampling of specific components and to achieve a saving of 543,000 rubles. Introduction of the sequential condensate demethanization and deethanization scheme at the NTR-5/6 and NTR-7/8 installations of the Minnibayevsk GPZ will make it possible to achieve a saving of 150,000 rubles. Redesign of the NTK [expansion unknown] installation and deethanization will make it possible to increase the quality of the produced ethane at the Neftegorsk GPZ to indices of mark "A" and to achieve a saving of 100,000 rubles. The degree of extraction of specific components will be increased and the saving will comprise 174,000 rubles with introduction of recommentations on injection of stable gasoline into the casing-head gas flow at the MTS [expansion unknown] installations of the Kazakh GPZ. Introduction of drain devices on the pentane plate column of the Shkapovsk GPZ will increase the operating efficiency of the column and reconstruction of the MAU [expansion unknown] for low-temperature processes will increase sampling of specific fractions. Construction of the hydrocarbon component dryer of the Otradnoye GPZ will improve the operation of the MTK installation. Introduction of a vortex separator at the Korobkovo plant will reduce absorbent losses with the dry gas. The use of a vortex pipe at the Perm GPZ will permit utilization of the energy of the baffled gas pressure for purposes of increasing propane output. Reconstruction of the MAU of the Gnedintsev GPZ for low-temperature processes will make it possible to increase the sampling of specific components, while reconstruction of the entire GPZ

Table 3. Growth Dynamics in Volumes of Products Sold, Balanced Profits and Level of Profitability for 1977, Percent

ГПЗ (1)	(2) Реализация продукции		(3) Балансовая прибыль		(4) Общая рентабельность	
	к 1976 г. (5)	к плану 1977 г. (6)	к 1976 г.	к плану 1977 г.	к 1976 г.	к плану 1977 г.
Миннибаевский (7)	103,1	109,0	85,6	102,4	25,4	29,5
Туймазинский (8)	99,2	104,9	—	119,7	0,9	—10,4*
Шкаповский (9)	100,6	102,1	—	105,8	—19,1	—28,0
Отрадненский (10)	96,2	101,5	93,3	103,3	41,7	37,1
Нефтегорский (11)	96,6	101,7	89,2	105,0	27,86	24,78
Коробковский (12)	87,0	101,0	—	—	—4,15	—17,4
Нефтекумский (13)	96,1	101,9	91,1	109,7	15,1	13,61
Севкавнефтегазпереработка (14)	114,1	102,6	—	—	—	—
Грозненский (15)	137,1	101,9	140,3	100,1	—7,5	—3,7
Вознесенский (16)	86,0	104,1	78,4	125,7	1,9	1,3
Пермский (17)	129,7	101,7	141,3	118,1	—6,0	—3,4
Нижневартовский (18)	155,2	103,5	325,3	105,0	—2,92	—5,43
Гнединцевский (19)	96,1	101,8	67,0	91,3	8,1	5,6
Долинский (20)	97,0	102,0	75,8	107,4	23,41	17,49
Бориславский (21)	102,7	103,9	82,4	111,5	17,6	13,1
Казахский (22)	199,1	103,6	309,1	137,2	2,0	5,0
Белорусский (23)	426,3	109,2	37,4	60,0	11,9	2,2
Всего по анализируемым ГПЗ (24)	113,9	104,4	101,1	109,9	8,2	6,95

*Reduction to the plan, i.e., an increase of losses.

Key:

1. Gas refining plant
2. Product sales
3. Balanced profits
4. Total profitability
5. Compared to 1976
6. Compared to 1977 plan
7. Minnibayevsk
8. Tuymazy
9. Shkapovsk
10. Otradnoye
11. Neftegorsk
12. Korobkovo
13. Neftekumsk
14. Northern Caucasus Petroleum and Gas Refining Plant
15. Groznyy
16. Voznesensk
17. Perm
18. Nizhnevartovsk
19. Gnedintsev
20. Dolino
21. Borislav
22. Kazakh
23. Belorussian
24. Total for analyzed GPZ

will permit production of individual hydrocarbons corresponding to GOST [State Standards]. Fulfillment of the enumerated measures in the future will permit a significant saving to be achieved.

Compared to 1975 and 1976, the gas refining plants improved somewhat their technical-economic indicators. At the same time, due to the absence of a sufficient quantity of raw material and sales of finished products, and also the imperfection of the pricing system, a number of GPZ were unable to completely utilize their own production capacities and to ensure production profitability.

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6521
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FUELS AND RELATED EQUIPMENT

UDC 665.511.23

EFFICIENT USE OF CASING-HEAD GAS RESOURCES

Moscow EKONOMIKA NEFTYANOY PROMYSHLENNOSTI in Russian No. 9, Sep 79, pp 32-36

[Article by E. M. Yasin and Ye. I. Kushnirova, VNIIOENG]

[Text] Despite the fact that casing-head gas extracted from the interior together with oil is a potential source for production of light individual hydrocarbons from ethane to hexanes, the need of the national economy for it is covered mainly by petroleum refining products. Moreover, the initial hydrocarbon potential of casing-head gases, estimated by the content of C_2 and higher components used in modern technology for chemical needs and also as effective service and motor fuels, is numbered in the tens of millions of tons.

Obviously, the problem of efficient use of casing-head gas resources reduces to the fact that the maximum possible replacement of oil by gas in the balance of its national consumption be provided with the limited resources contributed to their production and refining.

With this approach, which simultaneously corresponds to the requirement for saving petroleum resources, the level of final extraction of the individual C_{2+v} hydrocarbons (ethane, liquefied casing-head gases and unstable and stable gasolines) contained in them should be regarded as the goal of the program for efficient use of casing-head gas resources.

The corresponding indicator subsequently determined as the coefficient of the final use of casing-head gas resources is a reflection of the technical level of the subsector which characterizes the volumetric aspect of the production process. At the same time, analysis of the degree of production of high-quality products from casing-head gas is significant.

The goal of scientific-technical progress (NTP) of the entire plant complex for production and refining of casing-head gases is the given increase of the coefficient of final utilization of casing-head gas resources. The basis for formation of the given sector task considered as the goal of a complex scientific-technical program for increasing the degree of use of casing-head gas resources is a national economic task for production of individual hydrocarbons from them for fuel needs and petrochemical refining.

Thus, the task for increasing the technical level of the sector is determined by the need to provide a given volume of product output. Obviously, there are various capabilties for fulfilling it with larger or smaller indicators of utilization of resources, extraction of them for refining and the extent of refining.

Therefore, the level of the task should be established according to a program which would permit realization of the national economic task with minimum expenditures.

The specific indicator of the program is achieved by technical progress along an entire production chain: separation of the gas from the oil, collection and subsequent transport to the points of utilization, refining, transport of the gas refining products and subsequent fractionation of them. The corresponding process flow diagram and use of gas is given in Figure 1.

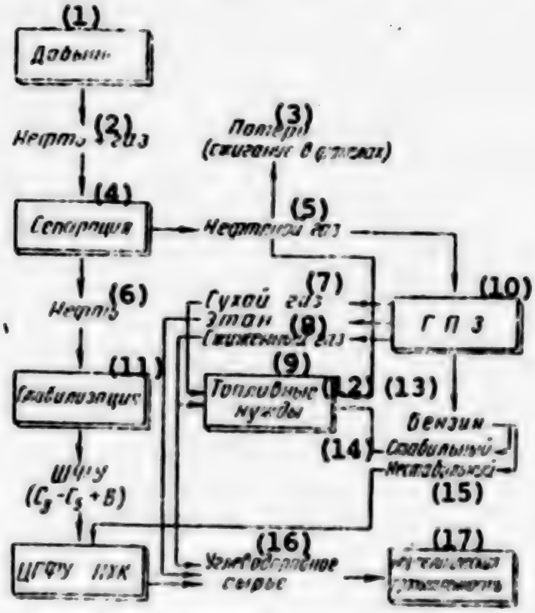

Figure 1. Diagram of Technology and Use of Gas

Key:

1.	Production	10.	GPZ
2.	Oil plus gas	11.	Stabilization
3.	Losses (burnoff)	12.	Fuel needs
4.	Separation	13.	Gasoline
5.	Casing-head gas	14.	Stable
6.	Oil	15.	Unstable
7.	Dry gas	16.	Hydrocarbon raw material
8.	Ethane	17.	Petrochemical industry
9.	Liquefied gas		

As can be seen from Figure 1, the degree of use of casing-head gas depends on the quality of separation, the extent of losses of the extracted gas, the extent of oil stabilization, the ratio of the volume of gas refining at the GPZ and the use of raw gas in industries and the extent of refining the gas at the GPZ and TsGFU [Central installation for gas fractionation].

According to this, the coefficient of the final use of resources (K) of casing-head gas can be represented in the following form:

$$K = K_{\text{с}} \cdot (1 - K_{\text{п}}) \cdot K_{\text{пер}} \cdot K_{\text{г}},$$

where K_s is the coefficient of sampling the gas from its resources at the stage of gas separation and oil stabilization and of delivery of it to the final points of consumption; K_p is the coefficient of casing-head gas losses in the fields (burning-off); K_{per} is the fraction of utilized gas directed toward refining; and K_g is the extent of refining, equal to the weight yield of individual C_{2+} higher hydrocarbons from their potential content in the casing-head gas, directed toward refining; as follows from the data of Figure 2, the characteristic of the extent of refining may be the degree of ethane extraction.

The given factors are indicators of the technical level of individual stages of the casing-head gas production and refining process. The sector task for the value of K is distributed by the components K_s-K_g, which reflect the degree of participation of each production process in increasing the degree of resource utilization.

At the same time, these indicators are the tasks of subsystems which produce and refine the gas or which create the corresponding production capacities. Thus, the value of the gas sampling coefficient is the task of the oil collecting and preparation subsystem, including construction which supports industrial development of fields. Thus, the established increase of indicator K_s is the goal of the sector program "An increase of casing-head gas resources," fulfillment of which is provided on the basis of strengthening the oil-field economy, improving the quality of separation and stabilization and preparation of oil.

The potential capabilities of the given program include an increase of gas resources by 20-30 percent due to reducing the losses of light hydrocarbons contained in the produced oil.

The task to reduce the volume of unutilized gas (burned off) to the value of K_p is addressed to the same subsystem and is provided mainly by its structural "block"--introduction of gas-collection lines, separation facilities and so on.

The production capacities of the subsystem are higher under conditions of limited labor resources, the higher the level of labor productivity in

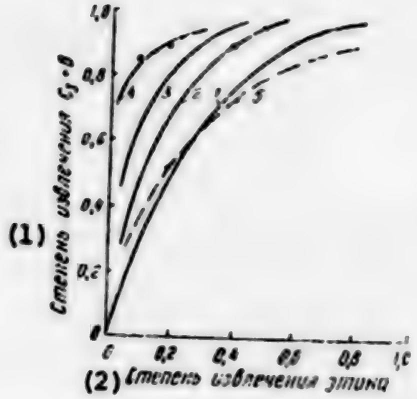

Figure 2. Variation of Degree of Extraction of C_{3+v} as a Function of the Degree of Ethane Extraction:
1--propane; 2--butanes; 3--pentanes; 4--gas-based gasoline; 5--extent of refining

Key:
1. Degree of extraction
2. Degree of ethane extraction

construction. This means that the main scientific-technical program which provides achievement of the specific indicator of the program "Increasing the level of gas utilization," is industrialization of construction of oil-field objects.

The task to capture the gas by refining K_{per} is fulfilled by the subsystem which includes the operational (existing GPZ) and construction (introduction of GPZ, gas pipelines and condensate lines) parts. Bringing the technical level of the subsystem up to the given value of K_{per} is the goal of the program "Increase the recovery of casing-head gas by refining." The main trend of NTP which provides fulfillment of the given program is industrialization of construction of gas refining plants and facilities.

Finally, the extent of refining is the task for the gas refining subsector directly, including construction of GPZ and gas fractionating facilities (GFU) at large GPZ. The corresponding program of NTP "Increasing the refining of casing-head gases," directed toward achieving a given indicator K_g, relies on such trends of NTP as development of low-temperature gas-fractionating equipment and industrialization of GPZ and GFU construction.

Thus, achieving the components of the indices of the complex program for increasing the degree of utilization of casing-head gas resources is the goal of the considered NTP programs in the area of production, use and refining of it. The measure of the balanced nature of these programs in the sense of an increase of their specific indicators is minimum national economic expenditures to achieve the task by the coefficient of the final use of casing-head gas resources.

Not one of the components of the indicators can serve separately as the goal of the complex program, since the efficiency of resource utilization is not completely characterized. For example, an increase of the degree of gas utilization (a decrease of K_p), frequently regarded as an indicator of solving the problem of utilizing gas resources, means shifting the losses of valuable hydrocarbon raw material from the wellhead to the GPZ with low level of refining.

Distribution of the task for the program among the four considered coefficients, which characterize the specific links of the production chain for utilization of casing-head gas resources, depends on the level of the technical-economic indicators of individual processes, resource and production capabilities for further improvement of them.

For example, investing funds to increase coefficient K_s is especially important where gas resources are being reduced under conditions of the existing gas refining system.

Thus, the basis of formation of tasks to develop the subsystems is their optimization, directed toward providing the maximum final effect (according to the final utilization coefficient) with limitation of the material and labor resources contributed to the complex program.

As follows from Figure 3, the indices of the subsystem are the goals of four scientific-technical programs optimized by the main oil- and gas-producing areas of the country. Achieving the territorial indicators is provided by special scientific-technical programs for the trends of science and technology. The indicators of technology (their relative improvement is determined on the diagram by α) and the volume of introducing hardware by regions (the degree of recovery of the corresponding fund by introduction is denoted by β) comprises the basis for development of the plan of scientific-technical progress.

The result of developing the program is distribution of the task by sectors for production of the final product (ethane-Q_{s2}, liquified casing-head gas Q_{sng}, unstable gasoline--Q_{nb} and stable gasoline--Q_b) and the tasks to related ministries by the volumes of construction-installation work (by petroleum stabilization--M_{stab}, by systems of development--M_{obustr} and for GPZ and GFU construction--M_{gpz} and M_{gfu} and by the output of the main hardware (stabilization facilities--N_{stab}, separation facilities--N_{sep} and GPZ and GFU complexes--N_{gpz} and N_{gfu}).

The given indicators include distribution of the volumes of product output in territorial profile, construction by areas and parameters of processes and hardware output by parameters of installations.

Thus, the final result of developing the program is the product output plan combined with the plan of scientific-technical progress.

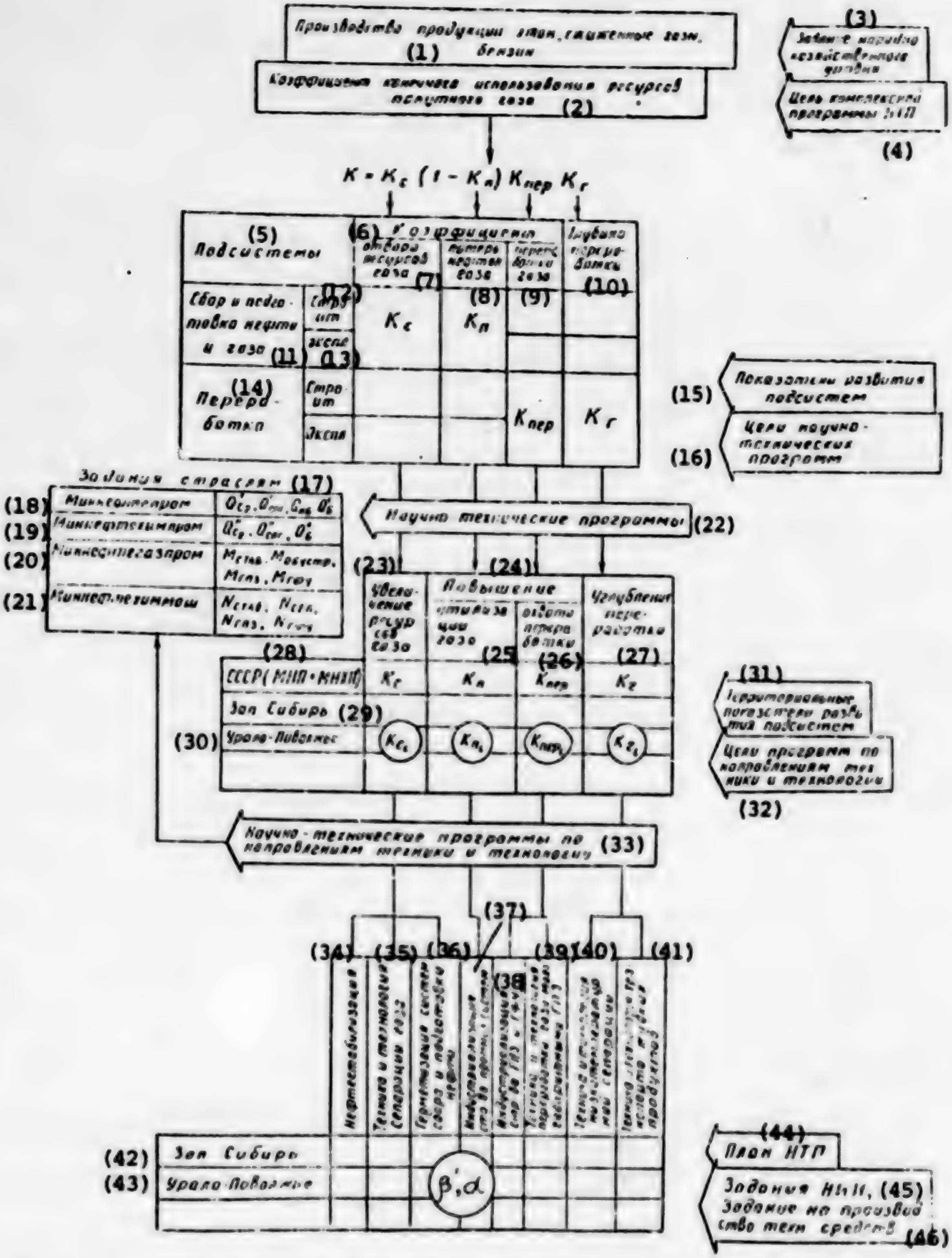

Figure 3. Product Output Plan Combined with the Plan of Scientific-Technical Progress as a Result of Program Development

[Key on following page]

[Continued from preceding page]

Key:

1. Ethane, liquefied gases and gasoline output
2. Coefficient of final utilization of casing-head gas resources
3. Task of national economic level
4. Goal of complex NTP program
5. Subsystems
6. Coefficient
7. Sampling of gas resources
8. Losses of casing-head gas
9. Gas refining
10. Extent of refining
11. Collection and preparation of oil and gas
12. Construction
13. Operational
14. Refining
15. Indicators of subsystem development
16. Goals of scientific-technical programs
17. Tasksto sectors
18. Ministry of the Petroleum Industry
19. Ministry of the Petrochemical Industry
20. Ministry of the Petroleum and Gas Industry
21. Ministry of Machine Building for the Petrochemical Industry
22. Scientific-technical programs
23. Increase of gas resources
24. Increase
25. Of gas utilization
26. Of recovery of refining
27. Extent of refining
28. USSR (Ministry of the Petroleum Industry plus Ministry of the Petrochemical Industry)
29. Western Siberia
30. Urals-Volga area
31. Territorial indices of subsystem development
32. Goals of programs by trends of equipment and technology
33. Scientific-technical programs by trends of equipment and technology
34. Petroleum stabilization
35. Technique and technology of gas separation
36. Sealing of petroleum collection and preparation systems
37. Industrialization of construction of industrial systems.
38. Industrialization of GPZ and GFU construction
39. Technique and technology of gas refining of small GPZ
40. Technique and technology of low-temperature separation
41. Technique and technology of transport of liquid products
42. Western Siberia
43. Urals-Volga area
44. NTP Plan
45. Tasks of scientific research institutes
46. Tasks for production of hardware

When the program is compiled, the problem of the ratio between the indicators of technology (α) and the volume of introduction (β) occupies a significant position since the same final effect (according to parameters of the processes K_8-K_9) can be achieved with different combinations of α and β. Sufficient attention should apparently be devoted here to the realizability of development and output of new equipment according to the deadlines of the cycle. To be oriented toward significant improvement of the parameters of equipment and technology means to reduce the load on related sectors, but at the same time to reduce the reliability of fulfilling the goals of the program. On the other hand, to agree to low tasks for qualitative indicators of hardware means to require a sharp increase in the volumes of their production, which may also be reflected in implementation of the program.

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6521
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FUELS AND RELATED EQUIPMENT

OVERVIEW OF OIL AND GAS PRODUCTION IN TURKMEN SSR

Moscow IZVESTIYA in Russian 5 Oct 79 p 2

/Article by Ch. Karryev, Chairman, Turkmen SSR Council of Ministers: "Rational Utilization of Mineral Resources"/

/Text/ Turkmenistan is an area of flowering oases, mountains, and vast deserts of the Karakum. This austere land preserves great riches. Here reserves of sodium sulphate, sulphur, concrete stone, and various hydromineral raw materials are being exploited, but the chief source of pride for Turkmenistan is oil and gas.

The oil and gas industry in the republic today is a rather large industrial complex which includes extractive enterprises, drilling organizations and construction elements (podrazdeleniye). The oil and drilling derricks, gas pipeline routes and pumping stations are reaching further and further from administrative centers established earlier. New settlements and cities have been built in previously uninhabitated desert areas.

Socialist competition has been broadly implemented in enterprises of the oil and gas complexes. The collective of the "Leninneft'" administration has already produced more than 1,000 tons of the "black gold" in excess of plan requirements. The brigades of G. Vel'mamedov, O. Garayev and M. Mordachev have performed in key fashion in well repair operations--the most complex sector. Right-flank participants in the competition also include the brigades of A. Amanyazov from the Kuydzhik Prospecting Drilling Administration and B. Logvinenko from the Koturdepinsk Drilling Operations Administration, those brigades planning to fulfill their five-year plan tasks in 4 years. The Mayskiy collective, and also the Vostochno-Shatlyk collective of the operations-production services and 12 drilling brigades of the VPO "Turkmengasprom" have already fulfilled the four-year plan.

The achievements of the gas extractors are particularly warming. In 3 years of the five-year plan, they have produced almost 7.9 billion cubic meters of the blue fuel above the plan. In 8 months of the current year, this figure has grown by another 1.6 billion. The implementation of a complex of organizational and techico-production programs in consonance with the introduction of new capacities is providing real opportunities for overfulfillment of Tenth Five-Year Plan tasks in gas extraction.

The recent decree of the CPSU CC and the USSR Council of Ministers "Improving planning and strengthening the effect of the management mechanism upon increased effectiveness of production and quality of operations" opens new vistas for the workers of the republic regarding creative approaches to this area. It is mandatory to attain improved planning operations, to select the most effective path to achieving high final results, to provide for a rational balance of industrial and territorial development, and a balanced growth of the economy.

A search is underway in all areas for unused reserves, and every collective is striving not only to guarantee a "key" finish for the Tenth Five-Year Plan, but also to define their capabilities in a timely fashion, and to outline precise goals for the future. During this work which is to be detailed and thorough, it is important to consider experience which has been gained, and to correctly assess the situation in our leading industries. There is something here to consider. The extraction of oil in the republic in recent years has systematically dropped. The maximum level extracted, 16 million tons, was attained in 1970, but in the current year, the "Turkmenneft'" association is projected to extract significantly less oil and gas. Still less oil and gas is projected for extraction for 1980 by the plan-draft. What is the problem? The low level of equipment provision for the association enterprises is having its effect. There are, however, other underlying reasons.

The high growth rates for extraction of the blue fuel by enterprises of the "Turkmengazprom" VPO are provided for by a rather extensive base and the preparation of newly prospected raw material reserves. A different picture exists for the oil workers. The volume of exploratory drilling by enterprises of the "Turkmenneft'" association over a recent period has not only not increased, but strange as it may seem, has dropped systematically. Nevertheless, year in and year out, the drillers have not fulfilled even the reduced requirements. Consequently, growth of reserves during the 3 year period has been two-fifths of the level planned.

The assimilation of new sites is, without question, the primary source of stable development of the oil industry, but the necessity for improving the use efficiency of operating well resources must not be forgotten. This area obviously has problems. The oil workers allude to miscalculations in the initial plans for assimilation produced by the institute, "TurkmenNIIPneft'". Indeed, at the institute's recommendation, development of the deposit was undertaken without stratum pressure maintenance. As a result, a sharp drop occurred in high-production deposits. Extraction dropped. However, the miscalculations of the planners did not become known just today or yesterday. Years passed, and the "Turkmenneft'" association and the USSR Minnefteprom have yet to adopt decisive programs to improve the situation regarding deposits already developed. For example, at the deposits of Koturdepe and Barsa-Gel'mes, extraction of liquid over 5 years was 172 million cubic meters, but only 14.5 million cubic meters of water was pumped in the productive horizons.

At several deposit sites it was decided to use natural gas as a source of high pressure due to a shortage of compressors. This, however, has yet to produce the expected effect: there is a shortage of underground equipment units for maintaining gas pressure and flow of necessary volume. The use of wells in such situations (plus weak soils and a considerable parafin content in the oil) has resulted in increased repair work and other supplemental measures, but the appropriate services of the association proved to be unprepared for these.

The Turkmenistan Communist Party Central Committee and the republic government are tasking the oil workers with stabilizing, and in the long-term, to increase the extraction of the black gold. Currently, several changes for the better have been noted. This year, more than 100 new wells have been placed in operation, and two oil and three gas deposits have been opened. It is obvious that this has been an uphill battle for the recently lagging collective from the "Kumdagneft'" administration. Labor productivity here has increased by four percent. Production valued at 100,000 rubles above plan quota has been realized. We have greater hopes for the organizational programs which have been implemented. Substantial assistance, in our view, will be provided by the concentration of major resources administration created by "Turkmenneft'" for increasing strata yield and for major overhaul of wells. A mobile mechanized unit (mekhkolonna) is being organized which will provide for the efficient deployment of people and equipment.

The successes, however, could be greater if interdepartmental discontinuities were overcome. Today, it is absolutely clear that the questions of oil and gas extraction development must not be attacked individually. They must be resolved within a unified complex. This, it goes without saying, demands the coordination of the activities of Minnefteprom, Mingazprom, and the USSR Mingeologiya. For example, the task is quite realistic for the enterprises of the "Turkmengazprom" administration to significantly increase the extraction of gas during the Eleventh Five-Year Plan.

In order to provide for the outlined extraction of gas, the drilling of exploratory wells must be practically doubled. In essence, the same tasks exist for the oil workers as well. Here, the extensive path by which volumes have grown to this point has practically exhausted its possibilities. The situation will not radically improve until a general search and exploration plan is developed. These operations are currently being conducted by three departments--the republican geological administration, the "Turkmenneft'" association, and the "Turkmengazprom" VPO. What is more, it is time to concentrate drilling operations under a single organization. A single administration and engineering policy and the centralization of financial, labor and material resources would provide for a significant increase in the efficiency of search operations and would increase reserves of oil and gas as well.

The coordination of resources and efforts would result in considerably more successful efforts to resolve problems of development for the production base and infrastructure, personnel training, and social-consumer problems. Much, of course, is being done in this direction: for just the gas extraction workers, a series of new construction projects has been released recently, including 143,000 square meters of living quarters. It must be recognized, however, that the construction of living quarters and of electric power lines, water lines, roads, and social-cultural-consumer projects is still seriously lagging behind our requirements. As a result, the transit "leg" for brigades grows ever longer, time is being lost, and personnel turnover increases. A similiar state of affairs exists in the oil industry also.

With allowance given the long-term development of the oil and gas industries in the republic, we presented to the union departments all calculations related to growth of production capacities, improvement of working and living conditions, and the development of the industry's infrastructure and construction base. The republic needs a specialized institute and a network of vocational schools. Just the "Turkmengazprom"

VPO requires 350 specialists with higher and middle specialized education and 830 qualified workers annually for the operation of newly introduced capacities. The time has come to ponder other questions associated with the reinforcement of personnel. All these problems are of state significance. We hope that the USSR Gosplan, in consonance with the interested ministries, will consider them in compiling programs for economic and social development for the next five-year plan. The oil and gas extraction workers of Turkmeniya will respond to this concern with new labor successes.

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FUELS AND RELATED EQUIPMENT

MANGYSHLAK TERRITORIAL-INDUSTRIAL COMPLEX

Moscow PRAVDA in Russian 27, 28 Oct 79

[Article by PRAVDA special correspondent M. Poltoranin: "The Mineral Resources of Mangyshlak"]

[27 Oct 79, p 2]

[Text] A ship carrying drilling rigs dropped anchor off the Mangyshlak Peninsula, where dunes creep off the cliffs into the depths of the Caspian Sea. At that time bitter mirabilite was being extracted from the black maw of the Kara-Bogaz-Gol on the southern periphery of the peninsula, while the north glowed crimson from the gas flares in the Emba oilfields. The Mangyshlak proper, a region of impassable alkali flats, had been little explored. Exploration by mineral prospectors occasionally paid off: oil and gas, phosphorite and manganese deposits were discovered. They ran the Uzen'-Gur'yev oil pipeline across the hills of the Mangyshlak. Towns began to spring up, and a new oblast was formed. Thus began the establishment of another industrial center in this country. The Mangyshlak Territorial-Production Complex is continuing to develop in the current five-yaer plan. Local party agencies certainly bear responsibility, jointly with the ministries involved in this important development project, for successful growth of the region's economy and for solving its social problems. Their concerns include a healthy morale on the peninsula, good working and living conditions, and from the very outset a high return on each and every ruble expended by the state, plus many other things. Are the ministries building this complex on the peninsula sufficiently solidly, taking into consideration future prospects, and what is the position of the Mangyshlakskaya Oblast Party Committee? These questions are raised in this report from Western Kazakhstan by a PRAVDA special correspondent.

Part 1. Conquest of the Desert

Prior to this trip to the Mangyshlak I had visited the peninsula on several occasions. It seemed only yesterday I had stood with the construction workers, who were building a rail line, gazing eagerly into the whitish haze over the Caspian, looking for the barge carrying fresh water from Makhachkala. And now, here in the town of Shevchenko, outside the window of the hotel they were watering the tall acacias with a hose. Strings of salt water distillation plants extend along the shore of a peninsula which does not contain a single stream or creek. It was not long ago that I had accompanied drilling crews across the oppressive sands, leading camels carrying loads of solar oil for a diesel generator -- the customary source of light in the work cars. And here I was dressed in a white smock, touring the world's first nuclear power plant with a fast-neutron reactor.

Each trip here one notices how much more pleasant the Mangyshlak becomes -- with the night lights of Novyy Uzen' and Zhetybay, vineyards adjoining factory buildings, and the long, drawn-out boat whistles at the port of Aktau. Conquering the desert with firm strides and transforming it, man is settling down here permanently.

During the early days of this complex I once was discussing its prospects with officials at the oblast party committee. This was an ideal situation, they enthusiastically pointed out, where designers and scientists can display their abilities to the fullest. Nobody confines their reach -- neither adjustments to old production nor planning distortions left as a legacy by one's predecessors. Mangyshlak was like a clean sheet of paper: go to it, utilizing the latest scientific advances.

First of all the scientists had to study and examine the stubborn character of the raw material and present recommendations to USSR Gosplan on how to exploit the peninsula's mineral resources most fully and cheaply. On this basis Gosplan was to come up with a master plan for the complex and subsequently to assign tasks to the ministries. Orderly planning and thought are needed in exploiting natural resources and developing new areas.

Was this "right moment" fully utilized to place a dependable compass in the hands of the trailblazers? If one tours the Mangyshlak today, one will see fairly clear-cut outlines of the territorial-production complex. The heat of the earth is flowing from the wells dotting the peninsula, through pipes to the oil refinery at Gur'yev. The casing-head gas is "picked up" by a gas processing plant occupying a site of almost 500 acres by the town of Novyy Uzen'. Product is transported from the plant in tanks to the rail yard. A 135 km pipeline also runs from here, to convey feedstock to the country's largest plastics plant. This enterprise will produce high-impact polystyrene, used in making refrigerators, air conditioners, and telephones.

A large conveyer has been set up alongside it, for the manufacture of shell rock slabs and other valuable products. And the reactor, which supplies the peninsula's industry with electric power and water, in the process of burning nuclear fuel simultaneously "produces" fuel in an even larger quantity.

Many regions could envy the well-conceived utilization of local resources. But the problem is that the plan of the complex is sometimes sketched in following the hasty landing of a worker assault force and temporary buildings are thrown up, while some areas still lack intelligent economic management recommendations. For this reason the production people at times proceed gropingly toward the designated goal of exploitation of mineral resources.

For example, when experts at the Ministry of the Petroleum Industry were designing the Uzen'-Gur'yev pipeline, they failed to take into consideration the fact that with frequent en-route heating of the viscous crude, the conventional steel insulation will not stand up to the heat. The pipeline was laid, but soon crude was leaking out and seeping into the sand. It was necessary to lay a new line on a rush basis. The people developing the Mangyshlak encountered another "surprise" while developing the fields. Desiring to raise formation pressure, the oilfield workers began injecting seawater at the advice of their ministry's scientists. It was suddenly discovered that they had contaminated the pools with bacteria which, propagating, are consuming the crude oil as it lies and leaving behind hydrogen sulfide. They are now erecting in Novyy Uzen' a plant to trap this insidious gas. Although there have not been too many such miscalculations here, these acts of ministerial carelessness, in addition to financial loss, result in interruptions in the rhythm of production and require hasty transfers of manpower to mend the situation.

So the compass in the hands of the Mangyshlak people still needs corrective adjustment. And this is one of the unavoidable concerns of the oblast party committee under the concrete conditions: to improve, to the extent of their ability, the region's industrial development plan and together with the ministries to correct and refine the specific development programs. A good deal is definitely being accomplished.

For example, 280,000 tons of large blocks are shipped out of the oblast each year from the peninsula's coquina quarries for sawing into facing tiles. Only one fourth of the material is actually going into finished product. The oblast committee sent a note to the Central Committee of the Communist Party of Kazakhstan requesting assistance in setting up a processing combine in Zhetybay. Somebody might say that this is not the concern of the oblast committee. But would it be right for the party committee to look on indifferently when dead ballast is being hauled, when rail traffic is being pushed to the limit of capacity? The enterprise is already under construction. In addition to tiles it will produce feed meal.

The oblast committee also assumed the initiative with development of the oilfields in the remote Mertvyy Kultuk zone. Oil was recently discovered there, and equipment was immediately rushed to the spot across the God-forsaken alkali flats. Seeing that equipment could be damaged due to the lack of roads in the area, the oblast committee bureau held a joint meeting with a field board of the Kazakh SSR Ministry of Roads. After this two specialized subdivisions were established on the Mangyshlak, and detachments from other oblasts came to assist. Construction of a road to the Mertvyy Kultuk field is proceeding rapidly: equipment is already being hauled on this road. Last spring the oblast committee bureau also issued a joint decree with the board of the USSR Ministry of Construction of Petroleum and Gas Industry Enterprises calling for ahead-of-schedule production startup at the Kalamkas and Karazhanbas fields. Execution of this decision is being monitored by the party agency's industrial transport section, and an oblast headquarters has been set up to coordinate contractor activities.

Of course the oblast committee's economic policy cannot and should not be restricted to correcting ministerial blunders and urging ministries to take a more aggressive stance. And these work forms proper are dictated not so much by the logic of life as by unforeseen circumstances.

The main tasks of the party organization of the oblast where the complex is being developed include indoctrination of cadres capable of intelligently managing new production facilities, concern for these cadres and mobilization, unification of the region's resources for successful accomplishment of the nation's purposeful program, for billions of rubles have been invested in the peninsula's economy. And the country is waiting in anticipation of growing flows of oil and gas, chemicals, energy, construction and other products.

Judging by many conversations, oblast officials are deeply aware of the significance of current tasks.

"The situation demands a high degree of competence and organization of us all, of each and every official," stated party oblast committee first secretary T. A. Ashimbayev at a recent oblast committee plenum. "We must seek production reserve potential in every area."

This is certainly stated clearly. What concrete deeds are reinforcing this mobilization appeal? From the very outset the oblast committee has devoted considerable attention to training a capable army of local specialists. The network of vocational schools has been expanded, engineers regularly visit related enterprises to obtain experience and know-how, and advanced labor methods, economics and political education schools have been established. The party committee constantly addresses these matters at bureau meetings and plenary sessions.

But here is what is disturbing: efforts do not always produce the desired results. What is the problem? Why, for example, is the shortage of skilled cadres and decline in production efficiency becoming more persistently evident with each passing day?

In order to understand this, I shall cite the following fact. The plastics plant expended considerable labor and money on training specialists for the new equipment and sent them elsewhere for on-the-job training. On their return they spent several months training workers. The time is approaching for the plant to start up production, but hundreds of people who have received thorough training have left the area. And all this because the construction people are far behind the completion schedule. Who is going to operate this custom-built equipment?

Oilfield operations today also require high skills and a permanent work force. But as soon as the first cold weather arrives, seasonal workers flock across the Caspian to the Mangyshlak from Makhachkala. In the spring, when the gardens of the Caucasus become warmed by the southern sun, they return home to raise vegetables. And here on the peninsula oil wells will be standing idle, although the schools have trained a sufficient number of oilfield workers. Specialists leave the peninsula due to a lack of decent housing and facilities.

Ways to increase production by the Mangyshlakneft' Association are specified at almost every oblast committee plenum. Bureau resolutions have been dedicated to the operations of this big enterprise. They also contain measures to improve things at the association. Its performance, however, is not improving: in 1975 more than 20 million tons of crude were produced, while last year the figure was only 14.8 million tons. The association is also failing to meet its targets at the present time.

With a generous investment of funds into the economy of this complex, a relatively moderate growth in industrial output volume was targeted: 9% for the first three years of the five-year plan. But even this target was too ambitious. Production volume declined by almost 9%.

Much thought must be given to the reasons for this. Some of them became more clear after I toured the Buzachi oilfield in the company of oblast officials.

[28 Oct 79, p 2]

[Text] Part 2. Not At Any Cost

We arrived at the Buzachi oilfield one windy morning; the surf was pounding the gently-sloping shore. Seashells crunched underfoot in the clinging sand, and a ground wind was throwing up reddish dust. They have been working here since winter setting up the recently-discovered Kalamkas oilfield; they had constructed a perimeter levee with bulldozers and had built temporary worker housing. The recently-constructed storage tanks were still patchy white from emulsion testing.

V. G. Savchenko, second secretary of the Mangyshlakskaya Oblast Party Committee, and M. Kh. Khusnutdinov, USSR Deputy Minister of Construction of Petroleum and Gas Industry Enterprises, made the rounds of all sites on a Niva: the men were working energetically. Service lines had been completed ahead of schedule, and welding on the tanks was completed. Khusnutdinov and Savchenko decided on the spot that since things were progressing so well, why not put the facility on-stream ahead of schedule? With a normal work pace they could expect to wait more than a month yet for the facility to go into operation — the pumping stations and power substation were not yet ready and, most important, the fire protection system was not yet installed. But why wait? they reasoned. Pumping crude into a storage tank with a temporary pump setup, they could draw up the working commission completion document. They can complete construction after that.

Putting aside other urgent matters, the trust managers, the general director of the Mangyshlakneft' Association, and officials of numerous administrations flew to Kalamkas.

I must state that the majority of experts opposed the ahead-of-schedule completion plan. "We'll pollute the area with crude," they argued, "and there is still a great deal of welding work to do. What will be the upshot of this display?" The firefighters and construction people were also opposed. But their objections were ignored. For 3 days aircraft were shuttling between Kalamkas and Shevchenko. And installation personnel were working the entire time on setting up the temporary pumps.

With the onset of darkness the bustle at the site would become particularly noticeable. A 40-meter column of flame was rising above a nearby well. They had been sinking it "to crude," but in their haste they had violated procedures, and pressure from a gas-bearing stratum had blown the equipment back up the borehole. Subsequent calculations indicated that this mishap had cost hundreds of thousands of rubles. The glow from this flare spread broadly across the sky; the silhouettes of construction workers flitted back and forth in the background.

Every morning V. G. Savchenko would walk down to the radio shack and call up the party oblast committee: any new developments on the peninsula? First Secretary T. A. Ashimbayev happened to be on vacation at the time, and the main responsibility rested on the shoulders of Vladimir Georgiyevich. Not all news was happy news. The oblast's industry was failing to meet the production target, and there were problems in other sectors as well. The officials from the trusts and enterprises should be managing their affairs on these difficult days, and here they were stuck out at Kalamkas.

Expending manpower and resources in order to report an ahead-of-schedule victory, unfortunately the officials in this oblast do not always ask the sober question: what for? Why, for example, should they build a ferry slip in the port of Aktau and never put it to use? Or why should they start up an oil industry facility in Novyy Uzen' if it is not yet ready for normal operation? There should be common sense involved in every hurried action. They forget about this on the Mangyshlak.

You will not see common sense at the Kalamkas rush-work sideshow either. When the well finally officially went into production, the officials offered mutual congratulations and headed back to the oblast seat. And the oil workers, having pumped a tank full of crude, shut the valves and stopped to ponder the matter. After all, the crude would be conveyed to Shevchenko by pipeline, and it was still under construction.

I met many experts at Buzachi. Everybody understood the logic behind M. Kh. Khusnutdinov's actions: he would fly to Moscow and report that he had "honorably" carried out his duty to the ministry -- the oilfield had been passed by the completion acceptance commission. He would report and hope to receive praise. Obviously they like to hear such reports at the ministry. It was not for his own pleasure that Marat Khayrutdinovich had swallowed Kalamkas dust and worked abrasive sand into his boots. It was more difficult to comprehend the position taken by another official, whose job it is to oppose narrow departmental interests.

Analyzing at an oblast party conference the reasons for a number of failures, V. A. Shemanskiy, first secretary of the Shevchenko City Party Committee, stated: "Oblast committee officials devote little attention to the basic long-range problems but become involved in minor administrative matters." The fact that this way of doing things has not yet been totally eliminated is unfortunately attested not only by the incident at Kalamkas. They sometimes fail to see major problems because of involvement with their own particular concerns; later, having tripped, they begin taking belated measures. This is what happened, for example, with the plastics plant: the construction people are failing to meet the enterprise completion deadline, although even quite recently there were no alarm signals coming from the project. It was necessary to call an emergency session of the oblast committee bureau and to determine what officials were responsible.

They do a lot of talking about increasing responsibility for the assigned task in this oblast: at meetings of oblast and city party activists, at plenary sessions and bureau meetings. Enterprise directors frequently present reports, for example, at the Novyy Uzen' and Shevchenko city committees.

We should mention that today there are many worthy commanders of production and gifted specialists on the peninsula, persons who possess the highest sense of responsibility. On my tours of the Mangyshlak I have met power engineers B. M. Borisov, Lenin Prize recipient, and I. P. Lazarev, construction engineer V. V. Vikhlyayev, geologist V. P. Tokarev, Lenin Prize recipient, and oilman T. T. Demko, who was appointed a few days ago manager of the industrial transport section of the party oblast committee. These people are doing their job confidently and responsibly.

But there still are many in the oblast who are endeavoring to build the complex at any cost. Of course the Mangyshlak party committees are called upon to raise their sense of duty and to instill in them a thrifty attitude toward spending the state's money. Why is it that with an abundance of conversations about the duty and responsibility of each individual, these qualities are not being developed in everybody? I believe that one of the reasons lies in a certain gap between word and deed. V. G. Savchenko, for example, is today reproaching the administration chief for wasteful mismanagement, but it was just yesterday that Savchenko himself was urging him to arrange for completion acceptance of the uncompleted facility at Kalamkas.

Here they sometimes speak of failures faired with formulations, while doing nothing about those specifically to blame.

And yet the facts impel one to do some serious thinking. V. L. Neumyvakin, for example, manager of the Mangyshlak Neftegazstroy Trust, together with subordinate officials arranged for formal completion acceptance of an uncompleted facility and transferred personnel elsewhere. The crude oil initial processing plant has been waiting since last year for the installation crews, the building's loose steel sheet sheathing flapping in the wind.

One look and you immediately recall that return on capital was pegged at as much as 32 kopecks per invested ruble.

Or take another example of negligent wastefulness. V. I. Timonin, general director of the Mangyshlakneft' Association, issued instructions to order approximately 200 water heating ovens. It was later determined that they are suitable only for low-flow wells. As it turns out, they are useless, with the result that piles of expensive ovens are standing in the desert, rusting away.

A well-measured step taken by any ministry official, local official or specialist adds strength to the region. And every miscalculation, every instance of negligence saps its strength, drop by drop. Take the Mangyshlak crude: the per-ton production cost has almost doubled in five years. Performance figures are being worsened not only by lowered pressure in the formation. A much greater influence is exerted by unneeded stoves, accidents, and alteration of facilities.

In handing over to the economic managers of this oblast the millions which the state is allocating for development of this complex, it is important to instill with party demandingness a thrifty attitude toward this wealth, because otherwise one simply loses track of the money being spent. There must be a thrifty attitude toward resources, and not only in this area.

In recent years city and oblast committee bureau resolutions have approved many valuable initiatives by the oilmen. We have excellent work forces of drillers, maintenance men and operators. These people are achieving fine results at the same time as their neighbors, with declining production figures, attempt to blame it on objective causes. Approved know-how, however, at times does not reach the fields due to insufficiently precise organizational work. It is correctly stated, for example, that there is benefit in the duty watch organization of underground well maintenance and that more of them should be set up. They ensure an increase in production of crude. But while there were 58 such duty watches in April, today there are 10 fewer.

As already mentioned in the first part of this report, a high rate of labor turnover is becoming a serious problem for the Mangyshlak. Is it that there are no funds available for housing? There are funds available; the ministries are quite generous with housing funding for the peninsula. The construction base here is strong, the envy of other young regions: if they are unable to complete construction on housing or a factory building, they have only themselves to blame. The Caspian Construction Administration is quite able, oblast committee officials acknowledge, to increase construction volume by not less than one third. Then what is the problem?

Apparently responsible officials are not sufficiently brought to account. A sea of geothermal water lies under the peninsula. All you have to do is sink a well, and yet there are practically no hothouses for growing vegetables on the Mangyshlak. A stone's throw away there is a warm sea, and yet there are as yet few recreation areas. And public food service is extremely poor. Public food service is almost entirely concentrated in the hands of the Workers' Supply Administration of the Mangyshlakneft' Association. URS [Workers' Supply Administration] chief I. I. Vanshel'boym has been given considerable authority, but they are not really insisting that he perform his duties. For example, for 3 days prior to our arrival at Buzachi there was no bread for the army of construction workers -- they had "neglected" to haul in a shipment. What is this official lacking in order to do a good job? After all, the URS chief has airplanes and refrigerator cars at his disposal.

The word available is frequently employed when speaking of the Mangyshlak. Yes, this is available, and that is available.... The state solicitously provides material support for the builders of the complex -- all they have to do is work. This is why contrasts of a high sense of duty and irresponsibility, energetic quest and willful pressure, success and failure existing side by side under equally good conditions are especially intolerable.

Raising the feeling of responsibility of the builders of this complex and mobilizing them with painstaking organizational work for successful implementation of the resolutions of the 25th CPSU Congress, one can count on better results. Reserve potential for this exists.

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